

(13)

(19) Japan Patent  
Office (JP)

(12) Japanese Patent  
Laid-Open Application  
Publication (A)

(11) Patent Laid-Open  
Application

No. 2003-231684  
(P2003-231684A)

(43) Date of publication  
of application:

August 19, 2003(2003.8.19)

(21) Patent Application: Patent Appln. No. 2002-29088(P2002-29088)	
(22) Filing Date: February 6, 2002(2002.2.6)	

(54) [Title of the Invention] CHOLESTEROL METABOLISM IMPROVING  
AGENT

(57) [Abstract]

[Problem to be Solved]

It is an object to provide a new cholesterol metabolism  
improving agent.

[Solution]

A cholesterol metabolism improving agent containing one or  
more condensed polyphenol compounds is provided.

[Advantages]

The cholesterol metabolism improving agent containing  
condensed polyphenol compound(s) according to the present  
invention has activities to remarkably reduce cholesterol  
contained in serum, the liver, and the entire body, but to  
maintain the amount of high-density lipoprotein cholesterol and  
thus exhibits an excellent cholesterol metabolism improving  
activity. Furthermore, it is possible to attempt to prevent and  
improve arteriosclerosis by ingesting the cholesterol metabolism

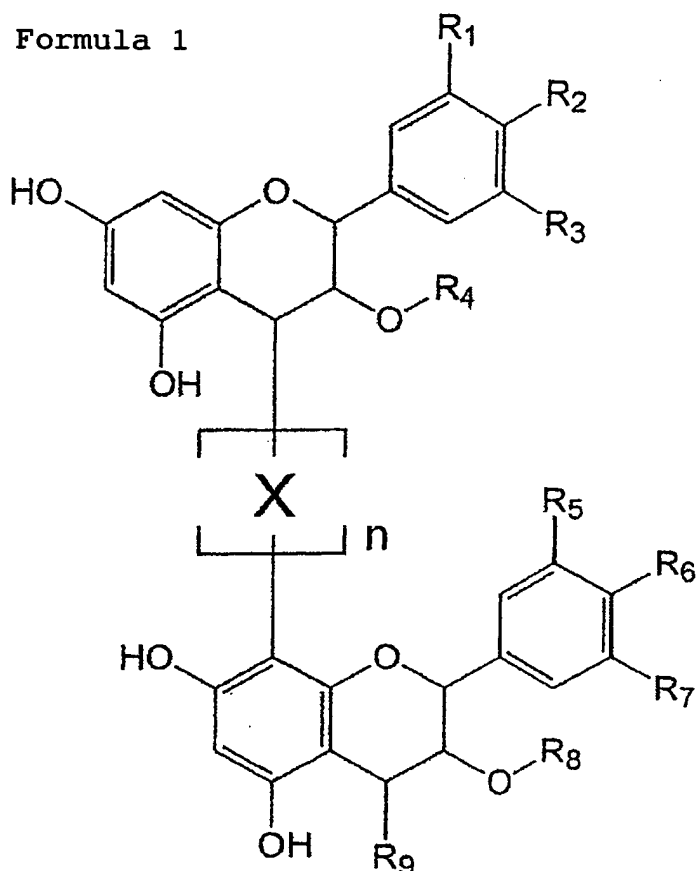
improving agent of the present invention in the form of a drug, a quasi-drug, a food, or the like in daily eating habits or the like.

[Claims for the Patent]

[Claim 1]

A cholesterol metabolism improving agent comprising one or more selected from condensed polyphenol compounds represented by Formula 1:

[Chemical Formula 1]

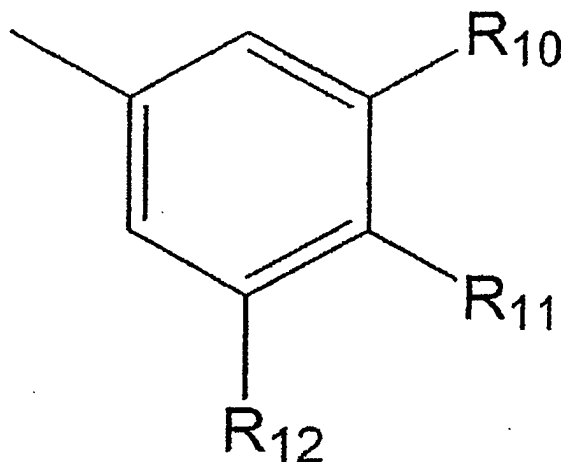


(wherein R<sub>1</sub> = H or OH, R<sub>2</sub> = H or OH, R<sub>3</sub> = H or OH, R<sub>4</sub> = H or a benzyl group represented by Formula 2, R<sub>5</sub> = H or OH, R<sub>6</sub> = H or OH, R<sub>7</sub> = H or OH, R<sub>8</sub> = H or a benzyl group represented by Formula 3, and R<sub>9</sub> = H or OH, and these are arbitrarily selected; n is selected in the range of n = 10 to 50; and X in Formula 1 has a

structure represented by Formula 4, and the structures of n "X"s may arbitrarily be the same or different),

[Chemical Formula 2]

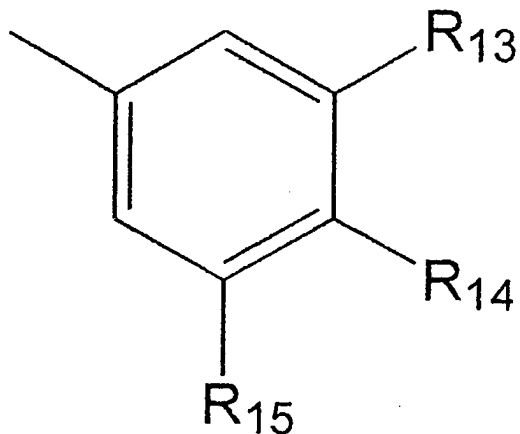
Formula 2



(wherein R<sub>10</sub> = H or OH, R<sub>11</sub> = H or OH, and R<sub>12</sub> = H or OH, and these are arbitrarily selected),

[Chemical Formula 3]

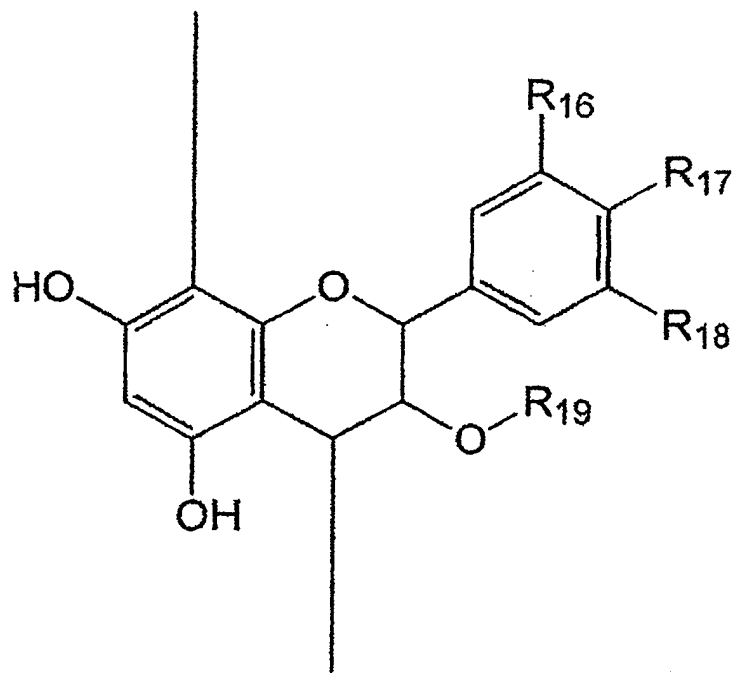
Formula 3



(wherein R<sub>13</sub> = H or OH, R<sub>14</sub> = H or OH, and R<sub>15</sub> = H or OH, and these are arbitrarily selected),

[Chemical Formula 4]

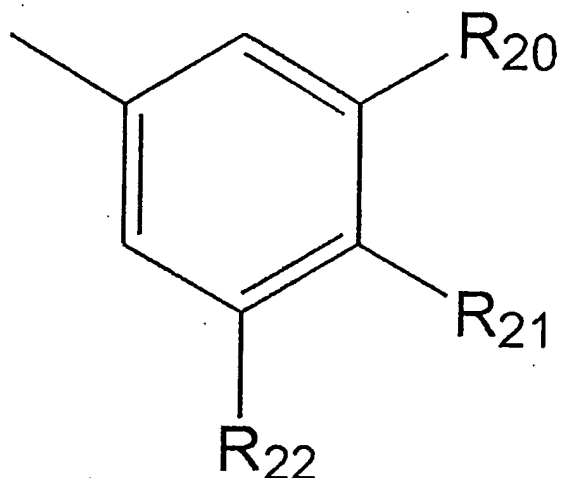
Formula 4



(wherein R<sub>16</sub> = H or OH, R<sub>17</sub> = H or OH, R<sub>18</sub> = H or OH, and R<sub>19</sub> = H or a benzyl group represented by Formula 5, and these are arbitrarily selected), and

[Chemical Formula 5]

Formula 5



(wherein R<sub>20</sub> = H or OH, R<sub>21</sub> = H or OH, and R<sub>22</sub> = H or OH, and these are arbitrarily selected).

[Claim 2]

The cholesterol metabolism improving agent according to claim 1, wherein the condensed polyphenol compound is persimmon tannin.

[Claim 3]

The cholesterol metabolism improving agent according to claim 1 or 2, characterized in that the content of low-density lipoprotein (including very low-density lipoprotein) cholesterol in human or animal blood is specifically reduced.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to application of a condensed polyphenol compound to drugs, quasi-drugs, or foods as a

cholesterol metabolism improving agent utilizing a cholesterol metabolism improving activity of the condensed polyphenol compound.

[0002]

[Conventional Art]

Sterol and derivatives thereof are essential constituents of a living body. Triacylglycerol and the like, which are called neutral fats, play roles for supplying and storing energy to be used in vivo. Cholesterol, which is one of sterols, and fatty acid esters thereof are important constituents of cell membranes and also serve as precursors of compounds, such as bile acid, steroid hormones, and vitamin D, which play various important roles in vivo.

[0003]

However, cholesterol having such important functions in vivo is, at the same time, a factor of development of arteriosclerosis, which is a present typical lifestyle-related disease. This is caused by an excessively high blood cholesterol level.

[0004]

In blood, cholesterol forms complexes with specific kinds of proteins and presents as lipoproteins. Among such lipoproteins, cholesterol-protein complexes classified as low-density lipoprotein cholesterol and very low-density lipoprotein cholesterol promote arteriosclerosis and, contrarily, cholesterol-protein complexes classified as high-density lipoprotein cholesterol suppress arteriosclerosis.

[0005]

Accordingly, it is generally thought that to reduce the content of lipid in particular, the content of low-density lipoprotein (including very low-density lipoprotein) in blood vessels, cholesterol may be an effective method for treating arteriosclerosis. As such a method, dietary treatment by restricting the amount of ingestion of meals themselves for preventing excessive ingestion of lipid, in particular, cholesterol; a method applying a substance inhibiting cholesterol absorption by the small intestine; or a method of activating cholesterol catabolism in vivo is carried out.

[0006]

However, arteriosclerosis cannot be surely cured only by reducing the amount of low-density lipoproteins excessively present in blood vessels and cannot be cured until the content of high-density lipoproteins is maintained in a normal condition.

[0007]

[Problems to be Solved by the Invention]

Under these circumstances, the present inventors have investigated methods of reducing lipid, in particular, cholesterol, in vivo and, as a result, have found the fact that blood cholesterol is decreased by the intake of a condensed polyphenol compound. Furthermore, the present inventors have investigated in detail and also have found the fact that the intake of a condensed polyphenol compound specifically reduces a content of low-density lipoprotein (including very low-density lipoprotein) cholesterol in blood while maintaining the content of high-density lipoprotein cholesterol. Consequently, the



investigation revealed that the condensed polyphenol compound has an activity of improving in vivo cholesterol metabolism.

[0008]

[Means for Solving the Problems]

That is, the present invention provides a cholesterol metabolism improving agent containing one or more condensed polyphenol compounds.

[0009]

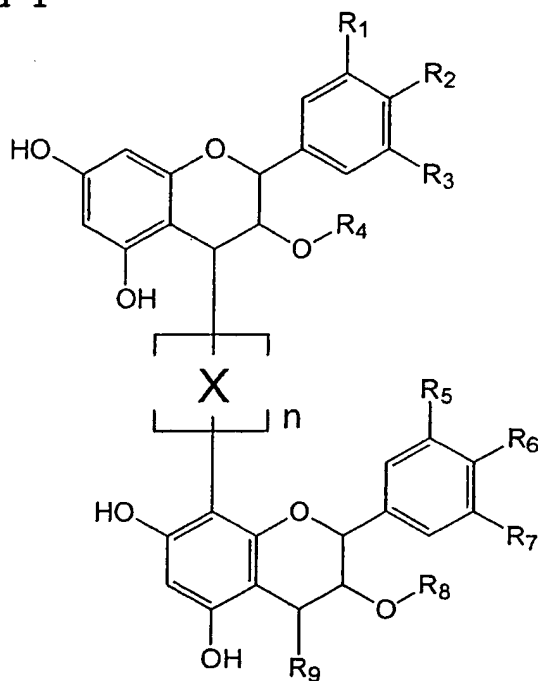
[Embodiments of the Invention]

The condensed polyphenol compound used in the present invention has a structure represented by Formula 1:

[0010]

[Chemical Formula 6]

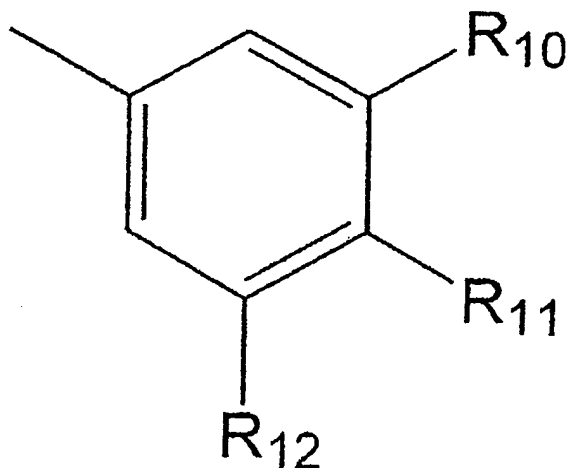
Formula 1



(wherein R<sub>1</sub> = H or OH, R<sub>2</sub> = H or OH, R<sub>3</sub> = H or OH, R<sub>4</sub> = H or a benzyl group represented by Formula 2, R<sub>5</sub> = H or OH, R<sub>6</sub> = H or OH,

$R_7 = \text{H or OH}$ ,  $R_8 = \text{H or a benzyl group represented by Formula 3}$ ,  
 and  $R_9 = \text{H or OH}$ , and these are arbitrarily selected;  $n$  is  
 arbitrarily selected in the range of  $n = 10$  to  $50$ ; and  $X$  in  
 Formula 1 has a structure represented by Formula 4, and the  
 structures of  $n$  "X"s may be the same or different),  
 [Chemical Formula 7]

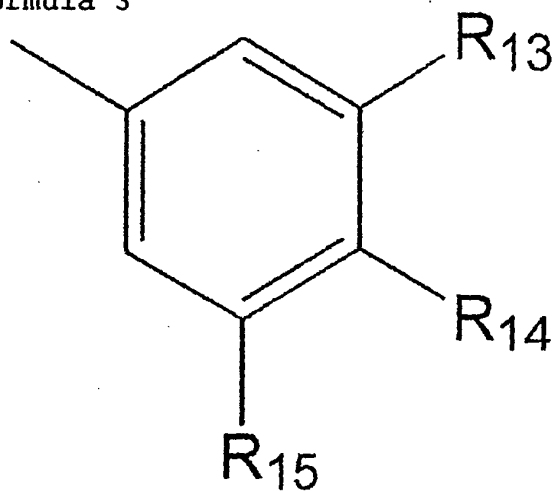
Formula 2



(wherein  $R_{10} = \text{H or OH}$ ,  $R_{11} = \text{H or OH}$ , and  $R_{12} = \text{H or OH}$ , and  
 these are arbitrarily selected)

[Chemical Formula 8]

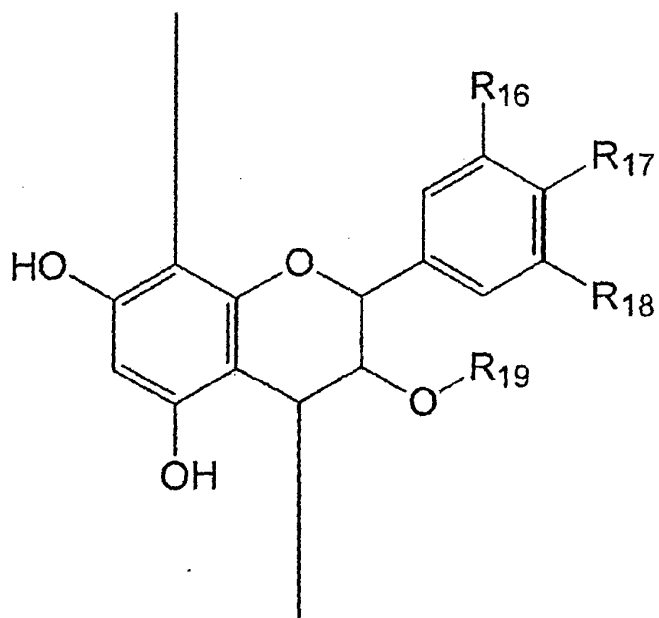
Formula 3



(wherein  $R_{13} = \text{H or OH}$ ,  $R_{14} = \text{H or OH}$ , and  $R_{15} = \text{H or OH}$ , and these are arbitrarily selected),

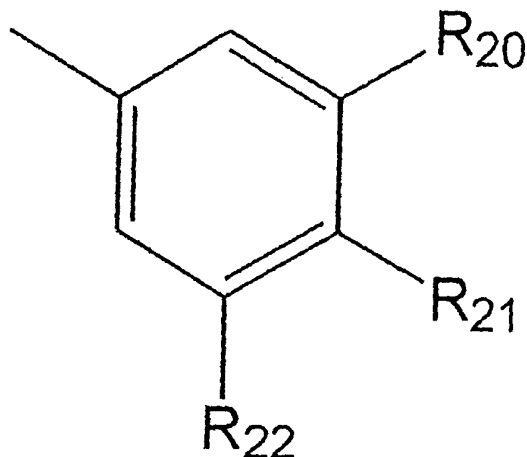
[Chemical Formula 9]

Formula 4



(wherein  $R_{16} = H$  or  $OH$ ,  $R_{17} = H$  or  $OH$ ,  $R_{18} = H$  or  $OH$ , and  $R_{19} = H$  or a benzyl group represented by Formula 5, and these are arbitrarily selected), and  
[Chemical Formula 10]

Formula 5



(wherein  $R_{20} = H$  or  $OH$ ,  $R_{21} = H$  or  $OH$ , and  $R_{22} = H$  or  $OH$ , and these are arbitrarily selected).

[0011]

The condensed polyphenol compound used in the present invention can be arbitrarily selected from the compounds having the aforementioned structures. The condensed polyphenol compounds that are chemically synthesized or extracted from natural products may be arbitrary applied.

[0012]

Among the condensed polyphenol compounds used in the present invention, persimmon tannin can be used preferably since it sufficiently exerts a cholesterol metabolism improving activity, is very easily available industrially and is hence particularly preferred.

[0013]

Persimmon tannin is extracted from ripe or overripe fruits, leaves, petals, calyxes, and so on of *Diospyros kaki* or *Diospyros lotus*, which are plants belonging to genus *Diospyros* of family Japanese persimmon tree. The extraction is mainly conducted by solvent extraction using a specific solvent. The solvent for the extraction may be determined in consideration of, for example, the purpose of use and the kind of a product to be subjected or a process to be conducted after the extraction. In general, the solvent is preferably one or a mixture of two or more selected from the group consisting of water; lower alcohol or water-containing lower alcohol, such as methanol, ethanol, propyl alcohol, isopropyl alcohol, butanol, and isobutanol; polyol or water-containing polyol, such as propylene glycol, 1,3-butylene glycol, and glycerin; and various types of organic solvents such as acetone and ethyl acetate. When inclusion of organic solvents is unpreferable because of the purpose of use, water may be used alone, or a highly volatile solvent is used for readily removing the solvent after extraction and the extract may be dissolved in water or the like after the solvent is removed.

[0014]

The aforementioned extract or extract liquid may be directly used as persimmon tannin, but is preferably further subjected to a purification process for increasing the persimmon tannin content in the extract or extract liquid. The purification process is conducted by, for example, degradation by addition of an acid (such as hydrochloric acid, sulfuric acid, nitric acid,

phosphoric acid, or an organic acid) or an alkali (such as sodium hydroxide, calcium hydroxide, or ammonia); fermentation or metabolic conversion by microorganisms; ingredient adsorption with an ion-exchange resin, activated carbon, diatomaceous earth, or the like; fractionation using chromatography with various separation modes (such as ion exchange, hydrophilic adsorption, hydrophobic adsorption, size exclusion, ligand exchange, affinity, and so on); filtration using a filter, a membrane filter, or an ultrafiltration membrane; pressurization or depressurization; heating or cooling; drying; content; distillation; pH adjustment; deodorization; decolorization; or storage by still standing for a long period of time. These processes may be arbitrarily selected as a combination thereof.

[0015]

The condensed polyphenol compound used in the present invention may be in any form, such as liquid, solid, powder, granule, paste, or gel, and an optimum form for producing an end product can be arbitrarily selected.

[0016]

The condensed polyphenol compound used in the present invention is applied to drugs, quasi-drugs, foods, and so on. The formulation is not particularly limited as long as it can be orally ingested and may be in any form, such as liquid, solid, powder, suspension, paste, gel, granule, or capsule. The condensed polyphenol compound may be in a form of a drug or quasi-drug in the aforementioned formulation or a food. Furthermore, the condensed polyphenol compound may be mixed in an oral delivery composition (a chewing gum, candy, tablet, or

the like), a fish paste product such as kamaboko or chikuwa, a livestock product such as sausage or ham, confectionery, traditional Japanese confectionery, noodles such as raw noodles, Chinese noodles, boiled noodles, or buckwheat noodles, seasoning such as sauce, soy sauce, basting, sugar, honey, powdered starch syrup, or starch syrup, spice such as curry powder, mustard powder, or pepper powder, processed vegetable or fruit such as jelly, marmalade, chocolate spread, pickles, delicatessen, furikake (powdery mix of dried food), or canned or bottled vegetable/fruit, a dairy product such as cheese, butter, or yoghurt, cereals, a fermented food, miso soup, soup, fruit juice, vegetable juice, whey drink, soft drink, or liquor.

[0017]

The content of the condensed polyphenol compound in a cholesterol metabolism improving agent according to the present invention is adjusted at the correct time depending on the use, form, sex and age of the subject being administered, health conditions of the subject being administered, and so on. In general, the content is preferably in the range of about 0.001 to 80 mass% to the total amount of the cholesterol metabolism improving agent. In particular, a content in the range of 0.1 to 30 mass% is preferred in consideration of safety to the human body and the level of cholesterol metabolism improving activity expression.

[0018]

In addition to the aforementioned essential ingredients, the cholesterol metabolism improving agent of the present invention and a drug, a quasi-drug, and a food containing the cholesterol

metabolism improving agent may further contain additional components and additives according to necessity within a range that the effect of the present invention is not impaired. These components and additives are used for achieving effects on health and beauty, such as nutrition support, fatigue healing, muscularity, or activation of cells (cellular antiaging), improving taste, a color tone or an aroma, imparting gloss, stabilization, viscosity control, sustained-release control, solubility aid, or preservation, and are arbitrarily selected from those shown below. The content of such an ingredient or additive in the cholesterol metabolism improving agent is not particularly regulated and, in general, is preferably 0.0001 to 50%. The following ingredients and additives may be added to the cholesterol metabolism improving agent of the present invention or a drug, a quasi-drug, or a food containing the same prior to or during the manufacturing process. The addition may be arbitrarily determined in consideration of workability in the manufacturing process.

[0019]

(1) Various types of oils and fats

Avocado oil, almond oil, fennel oil, perilla oil, olive oil, orange oil, orange-flower oil, sesame oil, cacao butter, chamomile oil, carrot oil, cucumber oil, beef tallowate, Kuku nut oil, safflower oil, shear butter, liquid shear butter, soybean oil, camellia oil, maize oil, rapeseed oil, persic oil, castor oil, cottonseed oil, peanut oil, turtle oil, mink oil, egg yolk oil, palm oil, palm kernel oil, haze wax, coconut oil,



beef tallow, lard, squalene, squalane, pristane, hydrogenated products thereof (hardened oils), and so on.

[0020]

(2) Fatty acids

Natural fatty acids such as lauric acid, myristic acid, palmitic acid, stearic acid, behenic acid, oleic acid, linoleic acid, linolenic acid, docosahexaenoic acid, eicosapentaenoic acid, 12-hydroxystearic acid, undecylenic acid, tall oil, and lanolin fatty acid; and synthetic fatty acids such as isononanoic acid, caproic acid, 2-ethyl butanoic acid, isopentanoic acid, 2-methyl pentanoic acid, 2-ethyl hexanoic acid, and isopentanoic acid.

[0021]

(3) Alcohols

Natural alcohols such as ethanol, isopropanol, lauryl alcohol, cetanol, stearyl alcohol, oleyl alcohol, lanolin alcohol, cholesterol, phytosterol, and phenoxyethanol; and synthetic alcohols such as 2-hexyldecanol, isostearyl alcohol, and 2-octyldodecanol.

[0022]

(4) Polyols

Ethylene oxide, ethylene glycol, diethylene glycol, triethylene glycol, ethylene glycol monoethyl ether, ethylene glycol monobutyl ether, diethylene glycol monomethyl ether, diethylene glycol monoethyl ether, polyethylene glycol, propylene oxide, propylene glycol, polypropylene glycol, 1,3-butylene glycol, pentyl glycol, glycerin, pentaerythritol, threitol, arabitol, xylitol, ribitol, galactitol, sorbitol, mannitol, lactitol, maltitol, and so on.

[0023]

(5) Esters

Isopropyl myristate, isopropyl palmitate, butyl stearate, hexyl laurate, myristyl myristate, oleyl oleate, decyl oleate, octyldodecyl myristate, hexyldecyl dimethyloctanoate, cetyl lactate, myristyl lactate, diethyl phthalate, dibutyl phthalate, lanolin acetate, ethylene glycol monostearate, propylene glycol monostearate, propylene glycol dioleate, and so on.

[0024]

(6) Gum substances, saccharides, or water-soluble high molecular compounds

Arabic gum, benzoin gum, dammar gum, guaiacum, Ireland moss, karaya gum, Tragacanth gum, carob gum, quince seed, agar, casein, lactose, fructose, sucrose and esters thereof, trehalose and derivatives thereof, dextrin, gelatin, pectin, starch, carrageenan, carboxymethyl chitin or chitosan, hydroxyalkyl (C2 to C4) chitin or chitosan having addition of alkylene (C2 to C4) oxide such as ethylene oxide, low molecular chitin or chitosan, chitosan salts, sulfated chitin or chitosan, phosphorylated chitin or chitosan, alginic acid and salts thereof, hyaluronic acid and salts thereof, chondroitin sulfuric acid and salts thereof, heparin, ethyl cellulose, methyl cellulose, carboxymethyl cellulose, carboxyethyl cellulose, sodium carboxyethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, nitrocellulose, crystalline cellulose, and so on.

[0025]

(7) Various vitamins

Vitamin A group: retinol, retinal (vitamin A1), dehydroretinal (vitamin A2), carotene, lycopene (provitamin A); vitamin B group: thiamine hydrochloride, thiamine sulfate (vitamin B1), riboflavin (vitamin B2), pyridoxine (vitamin B6), cyanocobalamin (vitamin B12), folates, nicotinic acids, pantothenic acids, biotins, choline, inositols; vitamin C group: vitamin C acid and derivatives thereof; vitamin D group: ergocalciferol (vitamin D2), cholecalciferol (vitamin D3), dihydrotachysterol; vitamin E group: vitamin E and derivatives thereof, ubiquinones; vitamin K group: phytonadione (vitamin K1), menaquinone (vitamin K2), menadione (vitamin K3), menadiol (vitamin K4), others, essential fatty acid (vitamin F), carnitine, ferulic acid,  $\gamma$ -orizanol, orotic acid, vitamin P group (eryocitrin), vitamin U, and so on.

[0026]

(8) Various amino acids

Valine, leucine, isoleucine, threonine, methionine, phenylalanine, tryptophan, lysine, glycine, alanine, asparagine, glutamine, serine, cysteine, cystine, tyrosine, proline, hydroxyproline, aspartic acid, glutamic acid, hydroxylysine, arginine, ornithine, histidine, and so on.; and amino acid derivatives such as sulfates, phosphates, nitrates, citrates, and pyrrolidone carboxylates thereof.

[0027]

(9) Various ingredients and additives derived from plant raw materials, animal raw materials, microorganism raw materials, or other natural materials

These materials may be used by arbitrarily selecting from various materials and processing them by usual methods according to types and forms of products to be added. (The processing may be conducted by, for example, pulverization, milling, washing, hydrolysis, fermentation, purification, squeezing, extraction, fractionation, filtration, drying, powdering, granulation, dissolution, preservation, pH adjustment, deodorization, decolorization, or an arbitrary combination thereof.)

[0028]

The solvent used in the extraction may be selected in consideration of, for example, the purpose of use and kind of a product in which the extract is used or a process to be conducted after the extraction. In general, the solvent is preferably one or a mixture of two or more selected from the group consisting of water; lower alcohol or water-containing lower alcohol, such as methanol, ethanol, propyl alcohol, isopropyl alcohol, butanol, and isobutanol; polyol or water-containing polyol, such as propylene glycol, 1,3-butylene glycol, 1,2-butylene glycol, 1,4-butylene glycol, 1,5-pentanediol, 1,2-pentanediol, 1,3-pentanediol, 1,4-pentanediol, 1,3,5-pentanetriol, glycerin, and polyethylene glycol (molecular weight: 100 to 100000); various kinds of organic solvents such as acetone, ethyl acetate, diethyl ether, dimethyl ether, ethyl methyl ether, dioxane, acetonitrile, xylene, benzene, chloroform, carbon tetrachloride, phenol, and toluene; acids (such as hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, formic acid, and acetic acid) and alkalis (such as sodium hydroxide, potassium hydroxide, calcium hydroxide, and ammonia)

that have an optionally adjusted normality. When inclusion of solvents is unpreferable because of the purpose of use, water may be used alone, or ethanol, which is readily removed after extraction, may be used alone or as an arbitrary mixture with water. In addition, an extract obtained by squeezing may be used.

[0029]

In the extraction, temperature of a solvent, weight ratio of the solvent to a raw material, and extraction time may be arbitrarily determined for each raw material and the solvent used. The temperature of a solvent can be arbitrarily determined in the range of  $-4^{\circ}\text{C}$  to  $100^{\circ}\text{C}$  and is preferably about 10 to  $40^{\circ}\text{C}$  from the viewpoint of stability of ingredients contained in a raw material. In addition, the weight ratio of a solvent to a raw material can be arbitrarily determined in the range of, for example, raw material : solvent = 4:1 to 1:10 and particularly preferably 1:1 to 1:5.

[0030]

The degradation can be conducted mainly, for example, by degradation by an acid, degradation by an alkali, degradation by an enzyme, or degradation by high temperature and high pressure. In the degradation by an acid, it is preferable to use an inorganic acid such as hydrochloric acid, sulfuric acid, nitric acid, phosphoric acid, acetic acid, formic acid, oxalic acid, hydrogen bromide, perchloric acid, or periodic acid, or an organic acid. In the degradation by an alkali, it is preferable to use sodium hydroxide, potassium hydroxide, calcium hydroxide, ammonium hydroxide, barium hydroxide, sodium carbonate, ammonium carbonate, calcium carbonate, magnesium hydroxide, sodium

silicate, or the like. In the degradation by an acid or an alkali, the content, reaction time, reaction temperature, and so on can be arbitrarily determined for a raw material as a subject. In the degradation by an enzyme, it is preferable to use an enzyme having a function to degrade a protein, a saccharide, a lipid, or a complex thereof that particularly plays an important role in a cellular structure, a tissue structure, or the like. Examples of the enzyme include protein degradation enzymes (proteases) such as aminopeptidase, dipeptidase, dipeptidyl peptidase, tripeptidyl peptidase, carboxypeptidase, serine protease, trypsin, chymotrypsin, cysteine protease, thiol protease, papaine, aspartate endopeptidase, metalloendopeptidase, bromelain, thermolysin, pronase, pepsine, rennin, pancreatin, chymopapain, ficin, collagenase, and elastase; polysaccharide degradation enzymes such as amylase, Taka-amylase, cellulase, hemicellulase, pectinase, polygalacturonase, dextranase, and pullulanase; and cell wall-degrading enzymes such as hen egg-white lysozyme, human lysozyme, papaya lysozyme, white turnip lysozyme, barley lysozyme, zymolyase, lysozyme chloride, glucanase, glucourondase, chitinase, and chilosanase. In the degradation by an enzyme, the content, reaction time, reaction temperature, pH of a solution, and so on can be arbitrarily determined and is particularly preferably determined to optimum values of the enzyme used.

[0031]

In the fermentation or metabolic conversion by microorganisms, at least one kind of microorganism is inoculated on a raw material serving as a substrate and is raised. The

inoculation of a microorganism on a substrate can be conducted by adding the microorganism directly to the substrate, or adsorbing the microorganism on a carrier such as alginic acid, polyvinyl, or gelatin and adding the microorganism in a form of, for example, microbead constituted by the microorganism and the carrier, or by using a bioreactor immobilizing the microorganism on the tube wall thereof. In the fermentation or metabolic exchange by a microorganism, the microorganism used is not particularly regulated and, in general, can be defined as microorganisms other than pathogenic microorganisms that exhibit significant toxicity to living bodies. Examples of the microorganisms belonging to yeast used include Genus *Aciculoconidium*, Genus *Actonia*, Genus *Aessosporon*, Genus *Ambrosiozyma*, Genus *Amphierna*, Genus *Anthomyces*, Genus *Apiotrichum*, Genus *Arthroascus*, Genus *Arxula*, Genus *Ascotrichosporon*, Genus *Ashbia*, Genus *Ashbya*, Genus *Asporomyces*, Genus *Atelosaccharomyces*, Genus *Azymocandida*, Genus *Azymohansenula*, Genus *Azymomyces*, Genus *Azymoprocandida*, Genus *Babjevia*, Genus *Ballistosporomyces*, Genus *Basidiotrichosporon*, Genus *Bensingtonia*, Genus *Blastobotrys*, Genus *Blastodendron*, Genus *Blastoderma*, Genus *Blastoschizomyces*, Genus *Botryoascus*, Genus *Botryozyma*, Genus *Brettanomyces* (*Brettanomyces bruxellensis*, *Brettanomyces anomalus* etc.), Genus *Bullera*, Genus *Bulleromyces*, Genus *Candida*, (*Candida albicans*, *Candida amylorenta*, *Candida anomala*, *Candida boidinii*, *Candida entomaea*, *Candida etchellsii*, *Candida famata*, *Candida fermentati*, *Candida guilliermondii*, *Candida halophila*, *Candida intermedia*, *Candida krusei*, *Candida lactosa*, *Candida lipolytica*, *Candida mogii*,

*Candida parapsilosis*, *Candida sake*, *Candida tropicalis*, *Candida versatilis*, *Candida vulgaris* etc.), Genus *Castellania*, Genus *Chlamydozyma* etc., Genus *Chromotorula*, Genus *Citeromyces*, Genus *Cladosporium*, Genus *Clavispora*, Genus *Crebrothecium*, Genus *Cryptococcus*, Genus *Debaryomyces*, (*Deharyomyces delbrueckii*, *Debaryomyces halotolerans*, *Debaryomyces hansenii* etc.), Genus *Debaryozyma*, Genus *Dekkera*, *Dekkeromyces* etc., Genus *Dematium*, Genus *Dipodascus*, Genus *Eeniella*, Genus *Enantiothamnus*, Genus *Endoblastoderma*, Genus *Endoblastomyces*, Genus *Endomyces*, Genus *Endomycopsis*, Genus *Endyllium*, Genus *Entelexis*, Genus *Eremascus*, Genus *Eremothecium*, Genus *Eutorula*, Genus *Eutorulopsis*, Genus *Fabospora*, Genus *Fellomyces*, Genus *Fermentotrichon*, Genus *Filobasidium*, Genus *Galactomyces*, Genus *Geotrichoides*, Genus *Geotrichum*, Genus *Guilliermondella*, Genus *Hanseniaspora*, Genus *Hansenula*, (*Hansenula anomala*, *Hansenula kluyveri*, *Hansenula miso*, *Hansenula polymorpha*, *Hansenula wickerhamii* etc.), Genus *Hypomyces*, Genus *Issatchenkia*, Genus *Kloeckera*, (*Kloeckera brevis*, *Kloeckera fluorescens*, *Kloeckera japonica* etc.), Genus *Klaeckeraspora*, Genus *Kluyveromyces*, (*Kluyveromyces bulgaricus*, *Kluyveromyces marxianus*, *Kluyveromyces thermotolerans* etc.), Genus *Kockovaella*, Genus *Kurtzmanomyces*, Genus *Leucosporidium*, Genus *Lipomyces*, Genus *Magnusiomyces*, Genus *Metschnikowia*, Genus *Microanthomyces*, Genus *Monillia*, Genus *Monospora*, Genus *Monosporella*, Genus *Mrakia*, Genus *Myceloblastanion*, Genus *Mycocandida*, Genus *Mycoderma*, Genus *Mycotorula*, Genus *Mycokluyveria*, Genus *Mycotoruloides*, Genus *Myxozyma*, Genus *Nadsonia*, Genus *Nectaromyces*, Genus *Nematospora*, Genus *Octosporomyces*, Genus *Ogataea*, Genus *Oidium*, Genus *Oospora*,



Genus Oosporidium, Genus Pachysolen, Genus Parasaccharomyces,  
 Genus Paratorulopsis, Genus Parendomyces, Genus Petasospora,  
 Genus Pichia, (Pichia amylophila, Pichia farinosa, Pichia  
 guilliermondii, Pichia membranifaciens, Pichia mogii etc.),  
 Genus Pityrosporum, Genus Procandida, Genus Procandida, Genus  
 Prosperobolomyces, Genus Proteomyces, Genus Pseudohansenula,  
 Genus Pseudomonilia, Genus Pseudomycoderma, Genus  
 Pseudosaccharomyces, Genus Pseudozyma, Genus Rhodomyces, Genus  
 Rhodosporidium, Genus Rhodotorula, Genus Saccharomyces,  
 (Saccharomyces aceti, Saccharomyces cerasi, Saccharomyces  
 cerevisiae, Saccharomyces exiguous, Saccharomyces unisporus,  
 Saccharomyces fibuligera etc.), Genus Saccharomycodes, Genus  
 Saccharomycopsis, Genus Saturnispora, Genus Schizoblastosporion,  
 Genus Schizosaccharomyces, Genus Schwanniomyces, Genus  
 Selenotila, Genus Selenozyma, Genus Smithiozyma, Genus  
 Sporidiobolus, Genus Sporobolomyces, Genus Sporothrix, Genus  
 Stephanoascus, Genus Sterigmatomyces, Genus Sympodiomyces, Genus  
 Syringospora, Genus Tetrapisispora, Genus Torula, Genus  
 Torulaspora, Genus Torulopsis, Genus Trichosporon, Genus  
 Udeniomyces, Genus Vanrija, Genus Waltomyces, Genus Willia,  
 Genus Williopsis, Genus Wingea, Genus Xanthophyllomyces, Genus  
 Yamadazyma, Genus Zendera, Genus Zygothrauxia, Genus Zygothrauxia,  
 Genus Zygothrauxia, Genus Zygothrauxia, Genus  
 Zygosaccharomyces, Genus Zymodebaryomyces, Genus Zymonema etc.  
 Examples of the microorganisms belonging to bacteria include  
 Genus Acetobacter (Acetobacter aceti etc.), Genus Achromobacter,  
 Genus Acidianus, Genus Acidobacterium, Genus Acidithiobacillus,  
 Genus Acrocarpospora, Genus Actinoalloteichus, Genus

Actinocorallia, Genus Actinokineospora, Genus Actinomadura,  
 Genus Actinoplanes, Genus Actinopolyspora, Genus Actinosynnema,  
 Genus Aerococcus, Genus Aeromicrobium, Genus Agrobacterium,  
 Genus Agromyces, Genus Ahrensia, Genus Alcaligenes, Genus  
 Alicyclobacillus, Genus Alloiococcus, Genus Alteromonas, Genus  
 Amorphosporangium, Genus Ampullariella, Genus Amycolata, Genus  
 Amycolatopsis, Genus Aquaspirillum, Genus Arcanobacterium, Genus  
 Arthrobacter, Genus Aureobacterium, Genus Azotobacter, Genus  
 Bacillus (Bacillus brevis, Bacillus subtilis etc.), Genus  
 Bacteroides, Genus Beneckea, Genus Bifidobacterium,  
 (Bifidobacterium bifidum, Bifidobacterium longum,  
 Bifidobacterium breve, Bifidobacterium infantis etc.), Genus  
 Brachybacterium, Genus Brevibacillus, Genus Brevibacterium,  
 Genus Brevundimonas, Genus Burkholderia, Genus Carnobacterium,  
 Genus Catellatospora, Genus Callulomonas, Genus Chainia, Genus  
 Chromobacterium, Genus Chryseobacterium, Genus Citrobacter,  
 Genus Clavibacter, Genus Corynebacterium, Genus Couchioplanes,  
 Genus Cryptosporangium, Genus Curtobacterium, Genus  
 Dactylosporangium, Genus Deinococcus, Genus Delftia, Genus  
 Demetria, Genus Dermacoccus, Genus Dermatophilus, Genus  
 Elytrosporangium, Genus Enterobacter, Genus Erwinia, Genus  
 Escherichia, Genus Eubacterium, Genus Excellospora, Genus  
 Exiguobacterium, Genus Faenia, Genus Flammeovirga, Genus  
 Flavobacterium, Genus Flexibacter, Genus Geodermatophilus, Genus  
 Globicatella, Genus Gluconacetobacter, Genus Gluconoacetobacter,  
 Genus Glycomyces, Genus Gordona, Genus Gordonia, Genus  
 Halobacterium, Genus Halococcus, Genus Herbidospira, Genus  
 Hydrogenophilus, Genus Hyphomicrobium, Genus Hyphomonas, Genus

Intraspore, Genus Janibacter, Genus Jonesia, Genus  
 Kibdelosporangium, Genus Kineococcus, Genus Kineosporia, Genus  
 Kitasatoa, Genus Kitasatospora, Genus Kitasatosporia, Genus  
 Klebsiella, Genus Kocuria, Genus Kurthia, Genus Lactobacillus,  
 (Lactobacillus rimae, Lactobacillus divergens, Lactobacillus  
 carnis, Lactobacillus piscicola, Lactobacillus acidophilus,  
 Lactobacillus amylophilus, Lactobacillus animalis, Lactobacillus  
 brevis, Lactobacillus casei, Lactobacillus curvatus,  
 Lactobacillus bulgaricus, Lactobacillus delbrueckii,  
 Lactobacillus fermentum, Lactobacillus fructivorans,  
 Lactobacillus fructosus, Lactobacillus helveticus, Lactobacillus  
 hilgardii, Lactobacillus homohiochii, Lactobacillus kefir,   
 Lactobacillus malefermentans, Lactobacillus murinus,  
 Lactobacillus paracasei, Lactobacillus paracasei subsp. Tolerans,  
 Lactobacillus parakefir, Lactobacillus pentosus, Lactobacillus  
 plantarum, Lactobacillus reuteri, Lactobacillus rhamnosus,  
 Lactobacillus sakei, Lactobacillus confusus, Lactobacillus  
 viridescens, Lactobacillus johnsonii, Lactobacillus viscosus,  
 Lactobacillus bunchneri, Lactobacillus fermentatae,  
 Lactobacillus acidophil-aerogenes, Lactobacillus leichmannii,  
 Lactobacillus gasseri, Lactobacillus bifidus, Lactobacillus  
 jugurt, Lactobacillus caucasicus, Lactobacillus arabinosus,  
 Lactobacillus kunkeei, Lactobacillus nagelii, Lactobacillus  
 fornicalis, Lactobacillus pentoaceticus, Lactobacillus xylosus,  
 Lactobacillus minutus etc.), Genus Leuconostoc (Leuconostoc  
 lactis, Leuconostoc dextranicum, Leuconostoc mesenteroides,  
 Leuconostoc oenos, Leuconostocparamesenteroides, Leuconostoc  
 cremoris, Leuconostoc citrovorum etc.), Genus Listonella, Genus

Lucibacterium, Genus Luteococcus, Genus Magnetospirillum, Genus  
 Marinilabilia, Genus Marinospirillum, Genus Mesorhizobium, Genus  
 Metallosphaera, Genus Methylobacterium, Genus Microbispora,  
 Genus Micrococcus, Genus Microellobosporia, Genus Micromonospora,  
 Genus Mycobacterium, Genus Mycoplasma, Genus Nocardia, Genus  
 Nocardioidea, Genus Nonomuraea, Genus Nonomuria, Genus  
 Oceanospirillum, Genus Ochrobactrum, Genus Oerskovia, Genus  
 Oligella, Genus Paenibacillus, Genus Pediococcus (Pediococcus  
 halophilis, Pediococcus acidilactis, Pediococcus cerevisiae,  
 Pediococcus pentosaceus, Pediococcus urinae-equi etc.), Genus  
 Pedobacter, Genus Peptococcus, Genus Peptostreptococcus, Genus  
 Pilimelia, Genus Pimelobacter, Genus Planobispora, Genus  
 Planococcus, Genus Planomonospora, Genus Prevotella, Genus  
 Propionibacterium, Genus Proteus, Genus Protomonas, Genus  
 Pseudomonas, Genus Pseudonocardia, Genus Rahnella, Genus  
 Rarobacter, Genus Rathayibacter, Genus Rhizobium, Genus  
 Rhizomonas, Genus Rhodobacter, Genus Rhodococcus, Genus  
 Rhodopseudomonas, Genus Rhodospirillum, Genus Rothia, Genus  
 Rubrobacter, Genus Ruegeria, Genus Saccharomonospora, Genus  
 Saccharothrix, Genus Serratia, Genus Sinorhizobium, Genus  
 Sphingobacterium, Genus Sphingomonas, Genus Sporolactobacillus,  
 Genus Stenotrophomonas, Genus Streptoalloteichus, Genus  
 Streptococcus (Streptococcus durans, Streptococcus faecalis,  
 Streptococcus faecium, Streptococcus bovis, Streptococcus  
 equinus, Streptococcus mutans, Streptococcus salivarius,  
 Streptococcus thermophilus, Streptococcus agalactiae,  
 Streptococcus mitis, Streptococcus pyogenes, Streptococcus  
 pneumoniae, Streptococcus lactis, Streptococcus dysgalactiae,

*Streptococcus sanguis*, *Streptococcus acidominimus*,  
*Streptococcus avium*, *Streptococcus uberis*, *Streptococcus cremoris*,  
*Streptococcus diacetylactis* etc.), Genus *Streptomyces*, Genus  
*Streptosporangium*, Genus *Streptoverticillium*, Genus *Terrabacter*,  
Genus *Thermoactinomyces*, Genus *Thermobifida*, Genus *Thermobispora*,  
Genus *Thermocrispum*, Genus *Thermomonospora*, Genus *Thermoplasma*,  
Genus *Thiobacillus*, Genus *Thiomonas*, Genus *Thiosphaera*, Genus  
*Weissella*, Genus *Xanthobacter*, Genus *Xanthomonas*, Genus  
*Zymomonas* etc. Examples of the microorganisms, other than yeast,  
belonging to Ascomycotina, Basidiomycetes, or Deuteromycotina  
include Genus *Allomyces*, Genus *Amoebidium*, Genus *Amorphotheca*,  
Genus *Arthroderma*, Genus *Ascoidea*, Genus *Ascobolus*, Genus  
*Ascodesmis*, Genus *Aspergillus*, Genus *Aureobasidium*,  
*Botryosphaeria* etc., Genus *Botryotinia*, Genus *Brachybasidium*,  
Genus *Byssochlamys*, Genus *Capnodium*, Genus *Ceratocystis*, Genus  
*Ceratomyces*, Genus *Chaetomium*, Genus *Chrysella*, Genus  
*Chrysocelia*, Genus *Chytridium*, Genus *Claviceps*, Genus  
*Cochliobolus*, Genus *Coemansia*, Genus *Coleosporium*, Genus  
*Coniochaetidium*, Genus *Cordyceps*, Genus *Cronartium*, Genus  
*Cyttaria*, Genus *Dasyscypha*, Genus *Derchslera*, Genus *Dichomyces*,  
Genus *Dothidea*, Genus *Endogone*, Genus *Entomophthora*, Genus  
*Emericella*, Genus *Eupenicillium*, Genus *Eurotium*, Genus  
*Exobasidium*, Genus *Gibberella*, Genus *Glomus*, Genus *Graphiola*,  
Genus *Gymnoascus*, Genus *Harpella*, Genus *Helicomyces*, Genus  
*Helvella*, Genus *Hemicarpaceles*, Genus *Hyphochytrium*, Genus  
*Hypocrea*, Genus *Laboulbenia*, Genus *Labyrinthula*, Genus  
*Leptosphaeria*, Genus *Leptophaerulina*, Genus *Lophodermium*, Genus  
*Melanotaenium*, Genus *Microascus*, Genus *Microstroma*, Genus

Medeolaria, Genus Melampsora, Genus Melamporella, Genus Morchella, Genus Monascus, Genus Monilinia, Genus Monoblephalis, Genus Mycospharella, Genus Nannizzia, Genus Nectria, Genus Neolecta, Genus Neurospora, Genus Nodulosphaeria, Genus Olpidium, Genus Peziza, Genus Penicillium, Genus Perenospora, Genus Pestalotiopsis, Genus Phomopsis, Genus Phragmidella, Genus Pneumocystis, Genus Preussia, Genus Pleospora, Genus Puccinia, Genus Pythium, Genus Ravenelia, Genus Rickia, Genus Rhinocladia, Genus Rhizidiomyces, Genus Rhizoctonia, Genus Sclerocleista, Genus Saprolegnia, Genus Satioella, Genus Sclerotinia, Genus Sclerotium, Genus Septobasidium, Genus Sordaria, Genus Sporidiobolus, Genus Stibella, Genus Stigmatomyces, Genus Sydowiella, Genus Talaromyces, Genus Taphrina, Genus Thraustochytrium, Genus Tolyposporium, Genus Trichoglossum, Genus Trichoma, Genus Ustilago, Genus Verticillium, Genus Xylaria and other genera.

[0032]

In the fermentation or metabolic conversion by microorganisms, in addition to various raw materials of plant raw materials, animal raw materials, or other natural materials, various compounds can be further added to the raw materials for controlling or activating growth or metabolism of microorganisms or inducing specific biosynthesis or a degradation path. For example, carbon sources include carbohydrates such as glucose, fructose, galactose, sucrose, maltose, mannose, lactose, glycerol, and starch; carbon hydrides such as ethane, methane, propane, and butane; and fatty acids such as formic acid, acetic acid, propionic acid, lauric acid, palmitic acid, oleic acid,

linoleic acid, and linolenic acid. Examples of nitrogen sources include ammonium salts such as ammonium sulfate, ammonium hydrochloride, and ammonium phosphate; and urea, uric acid, and amino acids. Furthermore, compounds having a composition containing vitamins, potassium, calcium, magnesium, sodium, sulfur, phosphorus, chlorine, or the like that are required by various microorganisms; and compounds having a composition containing iron, copper, zinc, cobalt, nickel, boron, manganese, molybdenum, tin, selenium, silicon, arsenic, vanadium, chromium, fluorine, or the like can be added. Furthermore, the optimal temperature, the amount of oxygen to be supplied, pH, pressure, and so on that affect on the growth or metabolic activity of various microorganisms can be arbitrarily determined depending on the individual characteristics of the microorganisms. For example, the temperature can be arbitrarily determined in the range of 10 to 50°C, and pH can be arbitrarily determined in the range of 1 to 14.

[0033]

The fractionation or purification can be arbitrarily performed by a usually known method, as well as solvent extraction, for example, fractionation by liquid chromatography (ion-exchange chromatography, ion-exclusion chromatography, affinity chromatography, gel-filtration chromatography, size-exclusion chromatography, hydrophilic adsorption chromatography, hydrophobic adsorption chromatography, ligand-exchange chromatography, and so on); dialysis with a semipermeable membrane; crystallization or re-crystallization of a component; filtration using filter paper, a membrane filter, an

ultrafiltration membrane, activated carbon, or a filter aid; centrifugation or its applications such as fractional precipitation or density-gradient centrifugation, e.g., red zone centrifugation or density-gradient sedimentation equilibrium.

[0034]

Examples of specific plants (crude drugs) used as raw materials include almond, polygonum, Sabia, aucuba, chinese bottle tree or chinese parasol tree, trilobus, Gastrodia elata f. viridis, acacia, Astilbe thunbergii, currant (fruit), red clover, red grape, logwood, Mallotus japonicus, common madder or European madder or madder, Chinese foxglove or rehmania, Ferula narthex, Thalictrum minus var. hypoleucum, Ulmus parvigolia, aguai guasu, Mauritia flexuosa, Akebia quinata, Cannabis Sat iva. L., tall morning-glory or Japanese morning-glory, hydrangea, Angelica keiskei, adzuki bean, false arborvitae, acerola, Queensland arrowroot, anise, abiu, abiurana, rape, oriental oak (fruit), avocado, flax, Gynostemma pentaphyllum, polygonatum, Amana edulis, Amaranthus (A. tricolor, A. caudatus, A. cruentus, A. patulus Bertoloni, A. retroflexus, A. spinosus, Epipactis helleborine, A. hypochondriacus), fritillaria or fritillary, alstroemeria, alkanet, Prosops pallida, althaea, arnica, variegated ginger or pinstripe ginger, aloe, aloe vera, angelica, apricot or xingren, benzoin tree, yellow sapota, Elephantopus mollis, Epimedium grandiflorum or Epimedium sagittatum, rush, Japanese knotweed, Japanese yew, strawberry, fig tree (fruit, leaf), Iris tectorum, velvetleaf, Pyrola japonica, ginkgo tree (seed, leaf), Japanese Milkwort, locust bean, whitlow grass, livid amaranth, rice plant (seed, seed coat), dill (seed),



*Thymus serpyllum* ssp. *quinquecostatus*, nettle, ylang-ylang,  
*Conandron ramondii* or *Selaginella* or *Selaginella tamariscina*  
 Spring, oolong tea, sweet fennel, marmalade box, river bulrush,  
 slenderstalk honeysuckle (fruit), caraway, turmeric, great  
 duckweed, *Asarum sieboldii* or *Asarum heterotropoides* or *Asarum*  
*europaeum*, mallow, white mallow, grass-like leaved orchis,  
 selfheal, udo or wild angelica, *Uncaria*, uva tea, Japanese  
 apricot (seed, flesh), *Uva-ursi*, Unshu mandarin, unboku,  
 estragon, Siberian ginseng, *Epipactis papillosa*, *Echinacea*,  
*Genista*, enokitake, sickle senna or *Cassia Tora*, *Hieracium*,  
 elder berry (fruit), *Elemy*, *Eryngium* or *Pleurotus eryngii*,  
*Sophora japonica*, *Silla* or *Astragalus*, *Polygonatum falcatum* or  
*Polygonatum sibiricum*, *Agave filifera* or *Agave victoriae-*  
*reginae*, Japanese goldthread, *Opuntia maxima*, *Trichosanthes*  
*bracteata*, elecampane, Chinese moonseed, Asiatic plantain,  
 Uniflower Swisscens-auric, Siberian hazelnut, Saguaro,  
*Atractylodes ovata* or *Atractylodes japonica*, Pride of India,  
*Alnus sieboldiana* (fruit), *Eriocaulon sieboldianum*, *Calocarpum*  
*sapota*, *Crataegus pinatifida* or *Crataegus cuneata*, barley, oka,  
*Cnidium monnieri*, *Abelmoschus esculentus* (fruit), *Inula*  
*britannica*, *Echinops latifolius*, *Panax japonicus* or *Panax*  
 ginseng, *Hypericum erectum* or *Hypericum perforatum* or St. John's  
 wort, cocklebur, *Polygonatum* or *Dioscorea tokoro* or *Dioscorea*  
*sativa*, *Gastrodia elata*, tiger lily or *Lilium japonicum* or  
*Lilium brownii*, *Orchis fauriei*, *Ononis*, *Ulmus laciniata*,  
*Patrinia scabiosaeifolia*, *Olluco*, cresson, parsley, *Psoralea*  
*corylifolia*, celery, olive (fruit, seed, leaf), oregano, orange  
 (fruit, pericarp), Hsiao, cacao (fruit, pericarp, seed), *Uncaria*

rhynchophylla, cat's food or ground ivy, *Epipactis thunbergii*,  
*Hydrangea macrophylla*, *Cinnamomum cassia*, *Broussonetia*  
*papyrifera* (fruit), *Curcuma zedoaria*, kashiwa oak, cascarilla,  
cascara sagrada, babies's breath, *Inula salicina*, climbing fern,  
kaniwa, carnation, *Valeriana fauriei*, birch, Japanese white  
birch or *Betula platyphylla*, transvaal daisy, pumpkin, kapok  
tree (seed), *Zanthoxylum simulans*, cat-tail, chamomile or Roman  
chamomile, *Tetrapanax papyiferus*, kamkam, calla, fumitory,  
Japanese snake gourd or Chinese snake gourd, *Pinellia ternata*,  
wild oak, Brazilian cocoa (seed), Chinese magnolia, karaya,  
*Eriocereus bonplandii*, Chinese quince, *Garcinia cambogia*, giant  
hyssop, *Potentilla chinensis*, *Veronica undulata*, *Trametes*  
*versicolor*, fringed pink or *Dianthus superbus*, *Artemisia apiacea*,  
*Artemisia capillaris*, *Euphorbia kansui*, glycyrrhiza, cantala,  
*Euphorbia antisyphilitica*, coltsfoot, canna, Chinese olive, red  
raspberry, kiwi fruit (fruit, leaf), *Trichosanthes kirilowii*,  
*Platycodon gradiflorum*, chrysanthemum, *Chrysanthemum seticuspe*,  
Chinese catalpa, *Rumex japonicus*, *Aurantii fructus*, *Hedera*  
*canariensis*, candelabra aloe, savory, kina, red cinchona, quinoa,  
phellodendron bark, *Gymnema sylvestre*, *Kereus peruvianus*,  
cabbage, carob (unripe fruit), caraway, cucumber, Chinese  
tamarisk, *Quillaja saponarea*, quillaja, bugleweed, *Citrus*  
*japonica* (fruit), *Opuntia leucotricha*, *Opuntia tuna*, betel  
pepper, hair-vein agrimony, *Cephalanthera falcata*, *Cephalanthera*  
*erecta*, *Cymbidium floribundam*, Guapeba-velmelha, guava (fruit),  
guayule, *Quercus infectoria*, Kukui nut, *Cephalanthera erecta*,  
*Lycium chinense*, *Asparagus cochinchinensis*, camphor, gooseberry  
(fruit), *Artemisia annua*, cutitiriba, gardenia, Japanese

chestnut oak, cupuacu, cubeba, kuma bamboo grass, Verbena  
 officinalis, Sophora flavescens, cranberry (fruit), chestnut  
 tree (seed, fruit, silver skin), Curculigo latifolia (fruit),  
 grapefruit (fruit, leaf), Japanese buckthorn, winter berry,  
 Rabdosia umbrosa or Rabdosia trichocarpa or Rabdosia japonica,  
 clove, Thlaspi avense, Japanese catnip, cockscomb, Epiphyllum  
 oxypetalum, laurel, Smilax glabra, gentiana, Japanese raisin  
 tree, Dendrobium crispulum, Kinokuni mandarin (Citrus leiocarpa,  
 Citrus tachibana, Citrus tangerina, Citrus tumida, Citrus  
 reticulata, Citrus reticulata), Rosa chinensis, lemon balm,  
 Broussonetia kazinoki (fruit), black tea, spatterdock,  
 Ligusticum sinense, Sorghum nervosum, Chinese ginger, coriander  
 (fruit), picrorhiza, Scutellaria baicalensis, cowberry, coconut  
 (fruit), Euodia ruticarpa, Rubus chingii, pepper, cosmos,  
 copaibabalsam, coffee (seed, leaf), magnolia kobus or Magnolia  
 liliflora, great burdock, Clematis apiifolia, sesame,  
 Scrophularia buergeriana, Schisandrae fructus, kadsura vine or  
 Kadsura japonica or Schisandra repanda, wheat, rice or rice bran  
 (red bran, white bran), rice bran oil, Cola acuminata (seed),  
 Cola vera (seed), coronilha, fenugree (fruit), Jateorhiza  
 columba, condurango, kombu, konjac, comfrey, sisal hemp,  
 Cremastra appendiculata, Neottia nidus-avis, Clematis chinensis  
 or Clematis chinensis Osbeck or Clematis terniflora, cherry tree  
 (Oshima cherry, mountain cherry, sargent cherry, Edohigashi  
 cherry, Prunus incisa, Prunus maximowiczii, Yoshino cherry,  
 Cerasus nipponica, Kasumi cherry, Prunus subhirtella, Prunus  
 lannesiana, Prunus kanzakura (leaf, flower, fruit, bark (cherry  
 bark)), cherry, sasa, Cephalanthera longibracteata, sasanqua,

oriental water plantain, sweet potato, sugar cane, sugar beet, spiny jujube, saffron, sapodilla, Yellow sapote, pomelo (fruit), soapwort, salmon berry (fruit), bugbane, *Echinops gmelinii*, sage, *Lobelia sessilifolia*, *Senecio pierotii*, Night-blooming cereus, *Codiaeum variegatum*, *Epimedium grandiflorum*, *Panax notoginseng*, Japanese cornel, Japanese pepper, *Sophora subprostrata*, Shea, *Butyrospermum parkii* (fruit), *Letinula edodes*, atarwort, *digitalis*, Rangoon-creeper, *Perilla frutescens* or shiso or perilla or Beefsteak plant, red sandalwood, Japanese lime, *Mognolia officinalis*, greenstem forsythia, *Lyophyllum aggregatum* (hinshimeji, *Lyophyllum fumosum*, *Lyophyllum decastes*, *Lyophyllum connatum*, *Hypsizigus marmoreus*, *Lyophyllum shimeji*, *Hypsizigus tricholomataceae*), magnolia, *Filipendura multijuga*, potato, peony, *Glehnia littoralis*, Spanish jasmine, snake's beard, *Gypsophila paniculata*, *Amomum xanthioides*, *Coix lacryma-jobi*, *Trachycarpus fortunei* (fruit), *Cymbidium goeringii*, ginger, *Dichroa febrifuga*, calamus, *Alpinia katsumadai* (fruit), Japanese white oak (seed), Hyacinth orchid, scarlet wistaria tree (seed), white clover, *Abrus fruticulosus*, *Iris florentina*, white flower ivy (flower), *Nandina domestica*, *Cinchona succirubra*, winter daphne, cinnamon, *Cinnamomum cassia*, water melon, Japanese honeysuckle, sorrel, suimu-berry (fruit), star apple, stevia, strawberry (fruit), *Cynanchum paniculatum*, field horsetail, purslane, plum (fruit), *Cymbidium ensifolium*, *Pinus sylvestris*, European larch, *Hedera helix*, English walnut, hawthorn, *Vaccinium myrtillus*, dandelion, horse chestnut, pear (fruit), meadow sweet, European elder, juniper, yarrow, Rosaceae centifolia, caper, mistletoe, *Mentha piperita* or balm mint,

horseradish, *Acorus gramineus*, *Dendrobium moniliforme*  
 (*Dendrobium linawianum*, *Dendrobium nobile*, *Oobanasekkoku*,  
*Dendrobium okinawense*, *Dendrobium officinale*, *Dendrobium*  
*phalaenopsis*, *Dendrobium tetragonum*, *Dendrobium tosaense*), cedron,  
 tree mallow, broad-leaved senega, senega, Japanese parsley,  
 celery, *Cnidium officinale*, *Andrographis paniculata*, China berry,  
 Indian fig, senna (fruit, leaf), *Clematis terniflora*, *Swertia*  
*japonica*, *Senboku*, *Amomum tsao-ko* Crebost et lemarie, zougechu,  
*Chimonanthus praecox*, buckwheat (seed nut), *Dioscorea cirrhosa*,  
 medical rhubarb, *Raphanus sativus*, bigarade, *Echinops grijisii*,  
 trailing eclipta, *Euphorbia pekinensis*, *Cibotium barometz*, dark  
 sweet cherry (fruit), trillium, thyme, *Dioscorea gracillima*,  
 almond willow, tamarind (seed), onion, *Magnolia salicifolia*,  
 Japanese aralia (fruit, leaf, root bark), tarajo, dahlia, tarwi,  
*Opuntia vulgaris*, red sage, Japanese dandelion or *Taraxacum*  
*albidum* or Mongolian dandelion, *Agathis gammara*, cherry (fruit),  
 cogon (fruit, root, sprout), *Panax japonicus*, chicory, Chanca  
 piedra, *Tulipa*, *Stachys Sieboldii*, *Rheum coreanum*, *Ulmus*  
*macrocarpa*, *Artemisia argyi*, *Polyporus umbellatus*, chorogi,  
*Oenothera tetraptera*, *Neottia kiusiana*, *Agaricus bisporus*,  
*Galeola septentrionalis*, camellia, Indian pennywort, *Sagina*  
*japonica*, dayflower, *Vigna umbellata*, *Galeola altissima*,  
*Polygonum multiflorum*, New Zealand spinach, bonnet bellflower,  
 leopard plant, coral tree, oriental walnut, dewberry (fruit),  
*Gelidium crinale*, *Rubus suavissimus*, *Lindera strychnifolia*,  
*Benincasae hispida*, *Uncaria sinensis*, *Capsicum annum*, *Angelica*  
*acutiloba*, *Calendula officinalis*, *Dipsacus asper*, corn or corn  
 silk, glossy privet, *Gentiana scabra* or gentian, horsetail,

rainbow plant, ipecac, *Cuscuta chinensis* or *Cuscuta australis* or *Cuscuta japonica*, hardy rubber tree (bark, leaf, root), *Fraxinus Japonica*, tomato, tragacanth, *Gleditschia tricanthos* (seed), Russell prairie gentian, *Potentilla erecta*, *Populus maximoviczii*, sunset hibiscus, tonka bean, Nigerian berry (fruit), Chinese yam or *Dioscorea japonica*, *Ruscus aculeatus*, *Elshotzia ciliata*, *Capsella bursa-pastoris*, rapeseed, sword bean or scimitar bean, Japanese summer orange, jujube, *Rosa laevigata*, *Dipsacus japonica*, *Pholiota nameko*, peanut, nandin, *Boehmeria nivea*, nigaki, *Artemisia absinthium*, nutmeg, cinnamon or *Cinnamomum sieboldii* or Ceylon cinnamon or *Cinnamomum japonica* or *Cinnamomum zeylanicum*, *Orchis joo-iokiana*, garlic chive, red-berried elder (fruit, flower, stem, leaf), garlic, sumac, cibol, *Albizia julibrissin* or pink siris or silk tree or *Mimosa nemu* or *Lycoris radiata*, Japanese thistle, *Rosa multiflora*, chinese trumpet vine, celosia, Siberian yarrow, *Angelica decursiva*, wild rose, *Prunus davidiana*, pineapple (fruit), hibiscus, *Gentiana decumbens*, Japanese maple, Pau d'arco, *Drynaria fortunei*, *Mucuna birdwoodiana*, *Orchis aristata*, *Dictamnus dasycarpus*, huckleberry (fruit), chick-weed, *Corylus heterophylla*, *Scopolia japonica*, sweet basil, lotus, parsley, naked oats, batata, hachiku or Henon bamboo, patchouli, mint, *Coix lacryma-jobi*, *Anemarrhena asphodeloides*, banana, oregano, *Tribulus terrestris*, vanilla beans, papaya, cotton weed, Pajaro Bobo, *Cassia obtusifolia* (whole grass, stem, leaf), paprika, *Epipactis papillosa*, *Vitex rotundifolia* or *Vitex trifolia*, *Cyperus rotundus*, *Tribulus terrestris*, *Peucedanum japonicum*, *Hamamelis virginiana*, palm, rosa, palata, *Havea brasiliensis*, *Agaricus campestris*,

aspidistra, Pterocarya paliurus, parietaria, Cymbidium  
nishiuchianum, balsamina, Japanese elm, barbasco, Gentiana  
thunbergii, Sterculia lychnophora, Artcapus altilis, codonopsis,  
pecan nut, spider lily, Dahlia coccinea, Echinops setifer, water  
chestnut, pistachio, sugar beet, Pyrrosia lingus, greenwoad,  
daisy, Achyranthes fauriei, hinachiyodori, Japanese cypress,  
hiba, castor bean, sunflower, sweet pepper, Semiaquilegia  
adoxoides, small bulrush, Agaricusblazei murrill, Neottia  
asiatica, piment (fruit), Angelica dahurica, Bletilla striata,  
Ganges amaranth (fruit), Althea officinalis, Chinese anemone,  
Japanese medlar (fruit, leaf, stem), betel palm, Puer tea, Piper  
kadzura, Petasites japonicus, Tussilago farfafa, thoroughwort,  
papaya bean, Daphne genkwa, grape (fruit, pericarp, seed, leaf),  
Fagus crenata, Cordyceps sinensis, Periandra mediterranea,  
Pfaffia iresinoides, blackcurrant (fruit), blackberry, branjen,  
plum (fruit), Furcellaria fastigiata, blueberry, prune, floral  
blanca, Plantago ovata, Vigna radiata, Corylus avellana, sponge  
gourd, Cymbidium dayanum, safflower, henequen, belladonna, berry  
(fruit), persea, Peruvianberg, Pereskia grandifolia,  
Hylotelephium erythrosticum or Sedum erythrosticum, boysenberry  
(fruit), Kochia scoparia or Belvedere or Summer cypress or  
Bassia scoparia, Cymbidium sinense, Pouteria sapota, Pouteria  
lucuma, Magnolia obovata, Ledebouriella seseloides, spinach,  
Chinese lantern plant, Magnolia hypoleuca, Chaenomeles speciosa,  
Chrysanthemum lavanfulifolium, Inula linariifolia, hosobanaokera,  
Sedum aizoon, Echinacea angustifolia, Tilia miqueliana, Paeonia  
suffruticosa (flower, leaf, stem, bark), Moutan cortex, hops,  
jojoba, borage, bordeaux, whortleberry (fruit), Cistanche salsa,

Dendrobium officinale, Arisaema heterophyllum, Grifola frondosa, Ephedra, Lepidium meyenii, macademia nut, marguerite, Digenea simplex, Morus alba (bark, leaf), Magnolia sprengeri, masaranduba, masaramduba do sealar, masheila de boi, Tropaeolum tuberosum, silver vine, pine cone, pine tree (leaf, bark, root), matta orro, Poria cocos, Buddlejia globosa, Origanum majorum, Sophorae radix, mulberry (fruit), marmelo, Verbascum thapsus, mango, mangosteen, chamomile, Junglans mandshurica, mandarin (fruit), Ganoderma lucidum, Citrus aurantium (fruit), Bupleurum scorzoneraefolium, Ottelia japonica or Ottelia alismoides, Lobelia chinensis, Lythrum anceps, Polygonum aviculare or Polygonum aviculare L., Menyanthes trifoliata, Cryptotaenia japonica, Calocarpum viride, Mentha arvensis, mimosa, Zingiber mioga, Synsepalum dulcificum (fruit), Commiphora myrrha, Terminalia chebura, Helichrysum bracteatum, althea, Aphananthe aspera, Sapindus mukorossi, munya, Lithospermum erythrorhizon, Zea mays, Milletia reticulata, Oputia megacantha, Leonurus sibiricus, Ocimum basilicum, Melaleuca alternifolia, Meliisa officinalis, melon (fruit), Artemisia mongolia, Phyllastachys pubescens, Pereskia aculeata, Shinus molle, mochi tree, Saussurea costus, Rheum palmatum, peach (leaf, seed, flower, fruit), bean sprouts, Morello cherry (fruit), Molokheiya, Ipomoea batatas, Alpinia oxyphylla, Rodgersia podophylla, Monarda fistulosa, yacon, Alnus firma or Alnus pendula or Alnus sieboldiana (fruit, pericarp, fruit head), Myrica gale, Fatsia japonica, mistletoe, willow (Salix gilgiana, Salix subfragilis, Salix babylonica, Salix chaenomeloides, Salix gracilistyla, Salix integra, Salix kinuyanagi, Salix koriyanagi, Salix



*matsudana* cv. *Tortuosa*, *Salix Reinii*, *Yashi*, *Salix saidaena*,  
*Toisusu urbaniana*, *Salix schwernii*, *Salix vulpina*, *Populus*  
*maximowiczii*), *Persicaria hydropiper* (leaf, stem), bushkiller,  
*Ardisia japonica*, *Carpesium abrotanoides*, Indian Poke, *Alnus*  
*hirsuta*, *Artemisia montana*, *yucca* or *brevifolia*, citron (fruit),  
 lily, *Angelica dahurica*, mugwort, *Polyporus mylittae*, *Citrus*  
*aurantifolia* (fruit), rye, *Momordica grosvenori* (fruit),  
 raspberry (leaf, fruit), *Latania*, *Allium chinense* or *Allium*  
*oschaninii*, Lavender, *Agave americana*, green tea, apple (fruit,  
 seed, leaf, root), *Gentiana scabra*, *rubus* or *suavissimus*,  
*Echinops ritro*, *Litchi chinensis*, lettuce, *Ribes rubrum* (fruit),  
*Hylocereus costaricensis*, lemon (fruit), *Cymbopogon citratus*,  
*Forsythia suspensa* or *Forsythia viridissima*, *Astragalus sinicus*,  
 Chinese milk vetch, *Chimonanthus praecox*, wax balm, *Phragmites*  
*communis*, loganberry (fruit), rosemary, *rosa canina*, *Wasabia*  
*japonica*, *Buddleia officinalis*, *Sanguisorba officinalis*, and so  
 on.

[0035]

Typical examples of algae include algae [green algae:  
*Chlorella vulgaris*, *Chlorella pyrenoidosa*, *Chlorella ellipsoidea*,  
 Green laver (*Enteromorpha linza*, *Enteromorpha prolifera*,  
*Enteromorpha compressa*, *Enteromorpha intestinalis*, *hosoeda*  
*aonori*), *Ulva pertusa*], algae [brown algae: sea tangle  
 (*Laminaria japonica*, *Laminaria ochotensis*, *Laminaria religiosa*,  
*Laminaria angustata*), *Undaria pinnatifida*, *Undaria undaroides*,  
*Undaria peterseniana*, Giant kelp (*Macrocystis pyrifera*,  
*Macrocystis integrifolia*, *Neoshittis luetokeana*), *Hizikia*  
*fusiformis*, *Fucus evanescens*, *Padina arborescens*, *Padina*

australis, *Padina australis* var. *cuneata*, *Padina japonica*,  
*Padina crassa*, *Padina japonica*. Yamada, *Padina minor*,  
*etsukiumiuchiwa*], algae [red algae: *Cyrtymenia sparsa*, *Gelidium*  
*elegans*, *Gelidium subfastigiatum*, *Gelidium japonicum*,  
*Pterocladia tenuis*, *Pterocladia densa*, *Yatabella*, *Acanthopeltis*  
*japonica*, *Gelidiella*, *Meristotheca papulosa*, *Eucheuma serra*,  
*Eucheuma amakusaense*, *Eucheuma cottonii*, *Eucheuma arnoldii*,  
*Chondrus ocellatus*, *Chondrus giganteus*, *Chondrus crispus*,  
*Chondrus yandoi*, *Chondrus armatus*, *Chondrus pinnulatus*, *Chondrus*  
*elatus*, *Chondrus verrucosus*, *Chondrus nipponicus*, *Chondrus*  
*pinnulatus*, *Chondracanthus tenellus*, *Chondracanthus teedii*,  
*Chondracanthus intermedius*, *Acrosorium flabellatum*, *Acrocodium*  
*venulosum*, *Acrosorium polyneum*, *Acrosorium yendoi*,  
*Akamomijinori*], and so on.

[0036]

In addition, other algae, for example, green algae (genus  
*Chlamydomonas*: *Chlamydomonas*, *Sarcodes sanguinea*, genus  
*Dunaliella*: *Dunaliella*, genus *Chroococcus*: *Chroococcus*, genus  
*Pandorina*: *Pandorina*, genus *Volvox*: *Volvox globator*, *Volvox*,  
genus *Palmella*, genus *Tetraspora*, genus *Spirogyra*: *Mougeotia*,  
*Spirogyra*, genus *Draparnaldia*, genus *Ulothrix*: *Ulothrix zonata*,  
genus *Ulva*: *Ulva pertusa*, *Ulva reiculata*, *Ulva arasakii*, genus  
*Prasiola*: *Prasiola japonica*, genus *Frichiella*, genus *Cladophora*:  
*Cladophora japonica*, *Cladophora sakaii*, *Cladophora glomerata*,  
*Aegagropila linnaei*, genus *Valoniaceae*: *Valonia macrophysa*,  
*Valonia aegagropila*, genus *Boergesenia*: *Boergesenia forbesii*,  
genus *Caulerpa*: *Caulerpa okamurae*, *Caulerpa recemosa*, *Caulerpa*  
*brachypus*, *Caulerpa scalpelliformis*, genus *Bryopsis*, genus

Codium: *Codium fragile*, *Codium subtubulosum*, *Codium sakibuchi*,  
*Codium cylindricum*, *Codium latum*, genus *Acetabularia*:  
*Acetabularia ryukyuensis*, genus *Chaetomorpha*: *Chaetomorpha*  
*spiralis*, *Chaetomorpha moniligera*, *Chaetomorpha okamurai*, genus  
*Closterium*, genus *Coleochaete*, genus *Cosmarium*, genus  
*Dictyosphaeria*: *Dictyosphaeria cavernosa*, genus *Monostroma*:  
*Monostroma nitidum*, *Monostroma latissimum*, *Monostroma grevillei*,  
*Kornmannia leptoderma*, genus *Oedogonium*, genus *Pediastrum*, genus  
*Trentepohlia*: *Trentepohlia aurea*, genus *Zygnema*, genus *Vaucheria*,  
and so on).

[0037]

Cyanophyceae (genus *Aphanothece*: *Aphanothece sacrum*, genus  
*Anabaena*, genus *Nostoc*: *Pleuroblastus simonii*, *Nostoc*  
*commune*, *Nostoc flagelliforme*, genus *Oscillatoria*, genus  
*Spirulina*: *Spirulina platensis*, genus *Tichodesmium*, and so on).

[0038]

Brown algae (genus *Pilayella*: *Pilayella littoralis*, genus  
*Ectocarpus*: *Ectocarpus siliculosus*, genus *Botrytella*: *Botrytella*  
*micromora*, genus *Ralfsiaceae*: *Ralfsia fungiformis*, genus  
*Sphacelariaceae*: *Sphacelaria tribuloides*, genus *Pycnonotus*:  
*Pycnonotus taivanus*, genus *Halopteris*: *Halopteris filicina*,  
genus *Cutleria*: *Cutleria cylindrica*, *Cutleria multifida*,  
*Cutleria adspersa*, genus *Dictyota*: *Dictyota dichotoma*,  
*sakibiroamizi*, genus *Pachydictyon*: *Pachydictyon coriaceum*,  
*Dilophus okamurae*, genus *Spatoglossum*: *Spatoglossum pacificum*,  
genus *Dictyopteris*: *Dictyopteris divaricata*, *Dictyopteris*  
*latiuscula*, *Dictyopteris prolifera*, genus *Stypopodium*:  
*Stypopodium zonale*, genus *Padina*: *Padina arborescens*, *Padina*

crassa, *Padina japonica*, genus *Elachista*: *Elachista taeniformis*,  
 genus *Halothrix*: *Halothrix ambigua*, genus *Leathesia*: *Leathesia*  
*difformis*, genus *Saundersella*: *Saundersella simplex*, genus  
*Ceratophyllaceae*: *Ceratophyllum demersum*, genus *Chordaria*:  
*Chordaria flagelliformis*, genus *Cladosiphon*: *Cladosiphon*  
*okamuranus*, genus *Eulalia*: *Eulalia*, genus *Tinocladia*: *Tinocladia*  
*crassa*, genus *Sphaerotrichia*: *Sphaerotrichia divaricata*, genus  
*Hydrilla*: *Hydrilla verticillata*, genus *Analipus*: *Analipus*  
*japonicus*, genus *Sphaerotrichia*: *Sphaerotrichia divaricata*,  
 genus *Ishige*: *Ishigeaceae okamurae*, *Leathesiaceae*, genus  
*Carpomitra*: *Carpomitra cabrererae*, genus *Sporochnus*: *Sporochnus*  
*radiciformis*, genus *Nereia*: *Nereia intricata*, genus *Desmarestia*:  
*Desmarestia ligulata*, *Desmarestia viridis*, *Tabacoides*, genus  
*Akkesiphycus*: *Akkesiphycus lubricus*, genus *Punctaria*: *Punctaria*  
*latifolia*, genus *Endarachne*: *Endarachne binghamiae*, genus  
*Petalonia*: *Petalonia fascia*, genus *Asperococcus*: *Asperococcus*,  
 genus *Coilodesme*: *Coilodesme japonica*, genus *Colpomenia*:  
*Colpomenia sinuosa*, *Colpomenia bullosa*, genus *Shimahukuronori*:  
*chishima-hukuronori*, genus *Hydroclathrus*: *Hydroclathrus*  
*clathratus*, genus *Chnoospora*: *Chnoospora implexa*, genus  
*Stictyosiphon*: *Stictyosiphon soriferus*, *Myelophycus*: *Myelophycus*  
*simplex*, genus *Striaria*: *Striaria attenuata*, genus *Scytosiphon*:  
*Scytosiphon lomentaria*, genus *Dictyosiphon*: *Dictyosiphon*  
*foeniculaceus*, genus *Chorda*: *Chorda filum*, genus *Agarum*: *Agarum*  
*clathratum*, genus *Costaria*: *costata*, genus *Cymathaere*:  
*Cymathaere japonica*, *Cymathaere japonica Miyabe*, genus  
*Laminaria*: *Laminaria coriacea*, *Laminaria religiosa*, *Laminaria*  
*diabolica*, *Laminaria yazoensis*, *Laminaria longissima*, *Laminaria*

yendoana, *Laminaria cichorioides*, genera *Kjellmaniella*:  
*Kjellmaniella gyrata*, genus *Eckloniopsis*: *Eckloniopsis radicata*,  
 genus *Ecklonia*: *Ecklonia cava*, *Ecklonia stolonifera*, *Ecklonia*  
*kurome*, genus *Thallasiophyllum*: *Thallasiophyllum clathrus*, genus  
*Nejirekonbu*: *nejirekonbu*, genus *Hedophyllum*: *Hedophyllum*  
*kuroshioense*, genus *Arthrothamnus*: *Arthrothamnus bifidus*, genus  
*Eisenia*: *Eisenia bicyclis*, genus *Alaria*: *Alaria praelonga*,  
*Alaria crassifolia*, genus *Silvetia*: *Silvetia babingtonii*, genus  
*Cystoseira*: *Cystoseira prolifera*, genus *Turbinaria*: *Turbinaria*  
*ornata*, genus *Myagropsis*: *Cystoseira hakodatensis*, *Myagropsis*  
*myagroides*, *Myagropsis yendoi*, genus *Sargassum*: *Sargassum*  
*nipponicum*, *Sargassum hemiphyllum*, *Sargassum segii*, *Sargassum*  
*horneri*, *Sargassum filicinum*, *Sargassum fulvellum*, *Sargassum*  
*sagamianum*, *Sargassum narasamo*, *Sargassum ringgoldianum*,  
*Sargassum tasaense*, *Sargassum patens*, *Sargassum thumbergii*,  
*Sargassum ringgoldianum*, *Sargassum fusiforme*, *Sargassum*  
*micracanthum*, *Sargassum micracanthum* Endicher, *Sargassum*  
*siliquastrum*, *Sargassum serratifolium*, *Sargassum giganteifolium*,  
 genus *Coccophora*: *Coccophora langsfordii*, genus *Macrocystis*:  
*Macrocystis pyrifera*, genus *Buluukimo*: *Buluukimo*, genus  
*Scytosiphon*: *Scytosiphon lomentaris*, and so on).

[0039]

Red algae (genus *Bangia*: *Bangia atropurpurea*, *Bangia*  
*gloiopeltidicola*, genus *Porphyra*: *Porphyra tenera*, *Porphyra*  
*yezoensis*, *Porphyra pseudolinearis*, *Porphyra dentata*, *Porphyra*  
*tasa*, *Porphyra variegata*, *Porphyra ampliccima*, genus  
*Rhodochorton*: *Audouinella howei*, genus *Trichogloea*: *Trichogloea*  
*hequieni*, genus *Liagora*: *Liagora caenomyce*, *Liagora japonica*,

*Liagora ceranoides*, genus *Nemalion*: *Nemalion vermiculare*,  
*Nemalion multifidum*, *Dermonema pulvinatum*, genus  
*Helminthocladia*: *Helminthocladia australis*, *Helminthocladia*  
*yendoana*, genus *Pinus*: *Pinus pinea*, genus *Scinaia*: *Scinaia*  
*japonica*, genus *Scinaia*: *Scinaia okamurae*, genus *Actinotrichia*:  
*Actinotrichia fragilis*, genus *Gagaxaura*: *Galaxaura fastigiata*,  
*Galaxaura falocata* Kjellm, genus *Ptilonia*: *Ptilonia okadae*  
Yamada, genus *Delisea*: *Delisea japonica* Okamura, genus  
*Bonnemaisonia*: *Bonnemaisonia hamifera*, *Asparagopsis taxiformis*,  
genus *Gelidium*: *Gelidium elegans*, *Gelidium pussillum*, *Gelidium*  
*crinale*, *Gelidium subfastigiatum* Okamura, *Gelidium tenue*,  
*Gelidium amansii*, *Gelidium linoides*, genus *Dudresnaya*:  
*Dudresnaya japonica*, *Dudresnaya minima*, genus *Hyalosiphon*:  
*Hyalosiphon*, genus *Pikae*: *Pikae yoshizaki*, genus *Dumontia*:  
*Dumontia contorta*, *Dumontia simplex*, genus *Masudaphycus*:  
*Masudaphycus irregulare*, genus *Constantinea*: *Constantinea*  
*subulifera* Setchell, genus *Neodilsea*: *Neodilsea yendoana*,  
*Neodilsea tenuipes*, genus *Portieria*: *Portieria hornemanni*,  
*Portieria japonica*, genus *Rhodopeltis*: *Rhodopeltis borealis*  
Yamada, genus *Contarinia*: *Contarinia kathy*, genus *Peyssonnelia*:  
*Peyssonnelia caulifera*, genus *Cruoriella*: *Cruoriella japonica*,  
genus *Amphiroa*: *Amphiroa dilatata*, genus *Corallina*: *Corallina*  
*officinalis*, genus *Grateloupia*: *Grateloupia filicina*,  
*Grateloupia ramosissima*, *Grateloupia divaricata*, *Grateloupia*  
*livida*, *Grateloupia okanurae* Yamada, *Grateloupia imbricata*  
Holmes, *Grateloupia carnosa* Yamada et Segawa, *Grateloupia*  
*elliptica*, *Grateloupia turuturu*, *Grateloupia lanceolata*,  
*Grateloupia kurogii* Kawaguchi, genus *Halymenia*: *Halymenia*

agaridhii, *Halymenia agaridhii*, *Halymenia acuminata*, genus  
*Prionitis*: *Prionitis patens* Okamura, genus *Polyopes*: *Polyopes*  
*polyideoides* Okamura, genus *Carpopeltis*: *Carpopeltis rigida*,  
*Carpopeltis angusta*, *Carpopeltis affinis*, *Carpopeltis prolifera*,  
*Carpopeltis crispata*, *Carpopeltis divaricata*, *Prionitis*  
*articulata* Okamura, *Prionitis cornea*, *Prionitis elata* Okamura,  
*Prionitis ramosissima*, genus *Cryptonemia*: *Prionitis schimitziana*,  
 genus *Gloiosiphonia*: *Gloiosiphonia capillaris*, genus *Baylesia*:  
*Baylesia plumosa*, genus *Gloiopeltis*: *Gloiopeltis complanata*,  
*Gloiopeltis furcata*, *Gloiopeltis tenax*, genus *Tichocarpus*:  
*Tichocarpus crinitus*, genus *Callophyllis*: *Callophyllis japonica*  
 Okamura, *Callophyllis crispata*, *Callophyllis palmata*,  
*Callophyllis adhaerens* Yamada, *Callophyllis adnata* Okamura,  
*Callophyllis cristata*, *Callophyllis hayamensis* Yamada,  
*Callophyllis mageshimensis* Tanaka, *Callophyllis rhyrachocarpa*,  
 genus *Callophyllis*: *Callophyllis firma*, genus *Cirrulicarpus*:  
*Cirrulicarpus gmelini*, genus *Kallymenia*: *Kallymenia sessilis*,  
*Kallymenia sagamiana*, *Kallymenia callophyllloides*, genus  
*Schmitzia*: *Schmitzia japonica*, genus *Tsengia*: *Tsengia nakamurae*,  
*Tsengia lancifolia*, genus *Platoma*: *Platoma*, genus *Schizymenia*:  
*Schizymenia dubyi*, genus *Halarachnion*: *Halarachnion latissimum*  
 Okamura, genus *Sebdenia*: *Sebdenia yamadae*, genus *Solieria*:  
*Solieria pacifica*, *Solieria tenuis*, genus *Meristotheca*:  
*Meristotheca coacta* Okamura, genus *Turnerella*: *Turnerella*  
*mertensiana*, genus *Catenella*: *Catenella caespitosa*, genus  
*Plocamium*: *Plocamium telfairiae*, *Plocamium leptophyllum*, genus  
*Hypnea*: *Hypnea charoides*, *Hypnea saidana*, *Hypnea variabilis*,  
*Hypnea japonica*, genus *Phacelocarpus*: *Phacelocarpus japonicus*

Okamura, genus *Caulacanthus*: *Caulacanthus okamurae*, genus  
*Sarcodia*: *Sarcodia ceylanica*, genus *Gracilaria*: *Gracilaria*  
*vermiculophylla*, *Gracilaria chorda*, *Gracilaria bursa-pastoris*,  
*Gracilaria gigas* Harvey, *Gracilaria incurvata* Okamura,  
*Gracilaria sublittoralis* Yamada et Segawa, *Gracilaria*  
*rhodocaudata* Yamamoto et Kudo, *Gracilaria salicornia* Dawson,  
*Gracilaria srilankia*, *Gracilaria sublittoralis*, *Gracilaria silva*,  
*Gracilaria edulis*, *Gracilaria eucheumoides*, *Gracilaria*  
*lemaniformis*, *Gracilaria punctata*, *Gracilaria arcuata*,  
*Gracilaria blodttii*, *Gracilaria coronopifolia*, *Gracilaria*  
*cumeifolia*, genus *Gelidiopsis*: *Gelidiopsis hachijoensis*, genus  
*Corallopsis*: *Corallopsis opuntia*, genus *Tylotus*: *Tylotus*  
*lichenoides* Okamura, genus *Ceratodictyon*: *Ceratodictyon*  
*spongiosum*, genus *Ahnfeltiopsis*: *Ahnfeltiopsis flabelliformis*,  
genus *Ahnfeltia*: *Ahnfeltia plicata*, *Ahnfeltia consinana*,  
*Ahnfeltia paradoxa*, genus *Stenogramma*: *Stenogramma interrupta*,  
genus *Gigartina*: *Mastocarpus yendori* Masuda et Yoshida,  
*Mastocarpus pacificus*, *Mastocarpus pacificus*, genus *Chondrus*:  
*Chondrus yendoi* Yamada et Mikami, genus *Mazzaella*: *Mazzaella*  
*japonica*, genus *Gloioderma*: *Gloioderma japonica*, genus *Faucheia*:  
*Faucheia spinulosa*, *Faucheia stipitata*, genus *Chrysomenia*:  
*Chrysomenia wrightii*, *Chrysomenia okanurai*, genus *Coelarthron*:  
*Coelarthron muelleri*, *Coelarthron coactum*, genus *Botryocladia*:  
*Botryocladia leptopoda*, genus *Cryptarachne*: *Cryptarachne*  
*polyglandulosa*, genus *Palmaria*: *Palmaria palmata*, *Rhodymenia*  
*intricata*, *Rhodymenia pertusa*, genus *Webberella*: *Webberella*  
*micans*, genus *Halosaccion*: *Halosaccion saccatum*, genus  
*Lomentaria*: *Lomentaria catenata* Harvey, *Lomentaria pinnata*,



Lomentaria Okamura, genus *Champia*: *Champia bifida*, *Champia*  
*expansa*, genus *Ceramium*: *Ceramium kondoi*, *Ceramium tenerimum*,  
*Ceramium paniculatum*, *Ceramium japonicum*, *Ceramium boydenii* Gepp,  
 genus *Campylaephora*: *Campylaephora hypnaeoides* J. Agardh,  
*Campylaephora crassa* (Okamura) Nakamura, genus *Herpochondria*:  
*Herpochondria elegans*, genus *Reinboldiella*: *Reinboldiella*  
*schmitziana*, family *Delesseriaceae*: *Hemineura shmiziana*,  
*Congregatocarpus pacificus*, *Neholmesia japonica*, genus *Sorella*:  
*Sorella repens*, genus *Nienburgia*: *Nienburgia japonica*, genus  
*Neohypophyllum*: *Neohypophyllum middendorffii*, genus *Myriogramme*:  
*Myriogramme*, *Hideophyllum yezoense*, genus *Acrosorium*: *Acrosorium*  
*venulosum*, *Acrosorium polyneurum*, *Acrosorium uneinatum*,  
*Acrosorium yendoii*, genus *Hymenena* Greville: *tenuis* Yamada, genus  
*Martensia*: *Martensia denticulata* Harvey, genus *Caloglossa*:  
*Caloglossa continua*, genus *Dasya*: *Dasya sessilis* Yamada, genus  
*Heterosiphonia*: *Heterosiphonia japonica*, *Heterosiphonia pulchra*,  
 genus *Taji-modoki*: *Tajimo-modoki*, genus *Polysiphonia*:  
*Polysiphonia morrowii*, *Polysiphonia crassa*, genus *Digenea*:  
*Digenea simplex*, genus *Chondria*: *Chondria armata*, *Chondria*  
*crassicaulis*, *Chondria dasyphylla*, *Chondria intertexta*, *Chondria*  
*ryukyuensis*, *Chondria expansa*, *Chondria lancifolia*, genus  
*Laurencia*: *Laurencia intermedia*, *Laurencia undulata*, *Laurencia*  
*pinnata*, *Laurencia Brongniartii* J. Agardh, genus *Kintarosiphonia*:  
*Kintarosiphonia*, *Kintarosiphonia fibrillosa*, genus  
*Symphyocladia*: *Symphyocladia marchantioides*, *Symphyocladia*  
*latiuscula* (Harvey) Yamada, *Symphyocladia linearis*, genus  
*Herposiphonia*: *Herposiphonia fissidentoides* (Holmes) Okamura,  
*Herposiphonia subdisticha*, genus *Melanamansia*: *Melanamansia*

glomerata, *Melanamansia japonica*, *Melanamansia mitsuii*, genus *Enantiocladia*: *Enantiocladia okamurae*, genus *Lenormandiopsis*: *Lenormandiopsis lorenzii*, genus *Neurymenia*: *Neurymenia fraxinifolia*, genus *Neorhodomela*: *Neorhodomela aculeata*, genus *Odonthalia*: *Odonthalia corymbifera*, genus *Batrachospermum*: *Batrachospermum gelatinosum*, *Batrachospermum helminthosum*, *Batrachospermum gallasei*, genus *Cyanidium*: *Cyanidium caldarium*, genus *Nemalionopsis*: *Nemalionopsis tortuosa*, genus *Polysiphonia*, genus *Porphyridium*: *Porphyridium cruentum*, genus *Thorea*: *Thorea okadae*, and so on.

[0040]

Charales (genus *Chara*, genus *Lamprothamnium*, genus *Nitellopsis*: *Nitellopsis obtusa*, genus *Lychnothamnus*, genus *Nitella*: *Nitella flexilis* var. *flexilis*, *Nitella acuminata* Braun var. *capitulifera*, genus *Tolypella*, and so on), Chromulinaceae (genus *Chromulina*: *Chromulina rosanoffii*, and so on), and so on.

[0041]

Furthermore, examples of animal raw materials include comb extract; bovine, porcine, or human placenta extract; porcine or bovine stomach, duodenum, intestine, or spleen extract or decomposition products thereof; bovine or porcine brain tissue extract; collagen derivatives such as water-soluble collagen and acylated collagen; collagen hydrolysates; elastin; elastin hydrolysates; water-soluble elastin derivatives; keratin, decomposition products thereof, or derivatives thereof; silk protein, decomposition products thereof, or derivatives thereof; porcine or bovine blood cell protein decomposition products (globin peptide); bovine or porcine hemoglobin decomposition

products (hemin, hematin, heme, protoheme, heme iron, and the like); milk; caseine, decomposition product thereof, or derivatives thereof; skimmed milk, decomposition products thereof, or derivatives thereof; lactoferrin or decomposition products thereof; hen egg components; fish decomposition products; nucleic acid-relating substance (ribonucleic acid, deoxyribonucleic acid), and so on.

[0042]

Examples of the components derived from the microorganism raw materials, which used as active ingredients or additives, include yeast metabolites, yeast extract, bacterium metabolites, bacterium extract, mold or mushroom metabolites, actinomyces metabolites, mold or mushroom extract, actinomyces extract, metabolites of *Bacillus subtilis* var. natto, extract from *Bacillus subtilis* var. natto, rice fermentation extract, rice bran (red rice bran, white rice bran) fermentation extract, *Euglena* extract or decomposition products thereof or water-soluble derivatives thereof, lactic acid fermentation products of raw milk or skimmed milk, trehalose or derivative thereof, and so on.

[0043]

Furthermore, as the plant, animal, or microorganism raw materials, arbitrary portions, cells, tissues, organs, and metabolites derived from transgenic products or cell fusion products can be used. In addition, culture cells that are obtained by culturing cells from an arbitrary portion, cell, tissue, organ, or the like, for example, culture cells derived from various tissues (culture cells derived from animal embryo

stem cell, fibroblast, Langerhans cell, macrophage, epidermal cell, liver cell, and so on), and undifferentiated cells, cells during differentiation, and metabolites thereof can be used.

[0044]

Examples of components of the natural materials used as active ingredients or additives include sea water such as deep water, for example, sea water salt, sea water-dried products, and ocean components such as inorganic salts (sodium chloride, magnesium chloride, potassium chloride, and the like) obtained from Dead Sea, Atlantic Ocean, or Pacific Ocean.

[0045]

(10) Alpha-hydroxylic acids

Glycolic acid, citric acid, malic acid, tartaric acid, lactic acid, and so on.

[0046]

(11) Pigmentation-preventing agent

Para-aminobenzoic acid derivatives, salicylic acid derivatives, benzenesulfonamide derivatives, imidazole derivatives, naphthalene derivatives, hydroxyanthranilic acid or salts thereof and their derivatives, anthranilic acid derivatives, coumarin derivatives, amino acid derivatives (such as 2-amino-3-[1-carboxyl-2-(1H-imidazol-4-yl)ethyl]aminobutanoic acid, 2-amino-3-[1-carboxyl-2-(1H-imidazol-4-yl)ethyl]aminobutanoic acid hydrochloride, sodium 2-amino-3-[1-carboxyl-2-(1H-imidazol-4-yl)ethyl]aminobutanoate, and potassium 2-amino-3-[1-carboxyl-2-(1H-imidazol-4-yl)ethyl]aminobutanoate), benzotriazole derivatives, tetrazole derivatives, imidazoiline derivatives, pyrimidine derivatives, dioxane derivatives,

camphor derivatives, furan derivatives, pyrone derivatives, nucleic acid derivatives, allantoin derivatives, nicotinic acid derivatives, ascorbic acid or salts thereof and their derivatives (such as magnesium L-ascorbylphosphate, ascorbyl palmitate, ascorbyl dipalmitate, ascorbyl hydroxyproline phosphate, 5-o- $\alpha$ -D-glucopyranosyl-L-ascorbic acid, an L-ascorbyl phosphate sodium salt, an L-ascorbyl phosphate potassium salt, an L-ascorbyl phosphate magnesium salt, an L-ascorbyl phosphate calcium salt, an L-ascorbyl phosphate aluminum salt, an L-ascorbyl sulfate sodium salt, an L-ascorbyl sulfate potassium salt, an L-ascorbyl sulfate magnesium salt, an L-ascorbyl sulfate calcium salt, an L-ascorbyl sulfate aluminum salt, sodium L-ascorbate, potassium L-ascorbate, magnesium L-ascorbate, calcium L-ascorbate, aluminum L-ascorbate, 6-o- $\alpha$ -D-galactopyranosyl-L-ascorbic acid, 2-o- $\beta$ -D-galactopyranosyl-L-ascorbic acid, an L-ascorbyl phosphate magnesium salt, an L-ascorbyl phosphate sodium salt, an L-ascorbyl sulfate sodium salt, a 6-o-acylascorbyl phosphate sodium salt, a 6-o-acylascorbyl phosphate ammonium salt, a 6-o-acylascorbyl phosphate isopropanolamine salt, 3-o-isopropyl-L-ascorbic acid, a 6-o-alkylascorbyl phosphate potassium salt, a 6-o-alkylascorbyl phosphate calcium salt, a 6-o-alkylascorbyl phosphate barium salt, a 6-o-alkylascorbyl phosphate ammonium salt, a 6-o-alkylascorbyl phosphate monoethanolamine salt, a 6-o-alkylascorbyl phosphate diethanolamine salt, a 6-o-alkylascorbyl phosphate triethanolamine salt, a 6-o-alkylascorbyl phosphate monoisopropanolamine salt, a 6-o-alkylascorbyl phosphate diisopropanolamine salt, a 6-o-

alkylascorbyl phosphate triisopropanolamine salt, 3-o-glycosyl-L-ascorbic acid, 6-o- $\beta$ -D-galactopyranosyl-L-ascorbic acid, ascorbic acid phosphoric acid cholesterol ester, L-ascorbyl palmitate, L-ascorbyl isopalmitate, L-ascorbyl dipalmitate, L-ascorbyl diisopalmitate, L-ascorbyl stearate, L-ascorbyl isostearate, L-ascorbyl distearate, L-ascorbyl diisostearate, L-ascorbyl myristate, L-ascorbyl isomyristate, L-ascorbyl dimyristate, L-ascorbyl diisomyristate, L-ascorbyl 2-ethylhexanoate, L-ascorbyl di-2-ethylhexanoate, L-ascorbyl-oleate, 2-o- $\alpha$ -D-glucosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltotriosyl-L-ascorbic acid, 3-o- $\alpha$ -D-glucosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltotriosyl-L-ascorbic acid, L-ascorbyl tetraisopalmitate, L-ascorbyl tetralaurate, L-ascorbyl tetra-2-ethylhexanoate, L-ascorbyl tetraolate, 5,6-isopropylidene-L-ascorbic acid, retinol L-ascorbate, L-ascorbyl DL-tocopherol phosphate, L-3-o-ethylascorbic acid, L-ascorbic acid tristearate, L-ascorbyl tripalmitate, L-ascorbyl trioleate, L-ascorbyl triphosphate, 2-o-ascorbyl cinnamate, 2-o-ascorbyl ferulate, 2-o-ascorbyl caffeate, 2-o-ascorbyl cinnapate, 2-o-[6-palmitoylascorbyl]-4'-acetoxysterulate, DL- $\alpha$ -tocopherol-2-L-ascorbyl phosphate, ascorbic acid/inositol conjugate derivatives, phosphamide ascorbate derivatives, ascorbic acid arbutin conjugates, ascorbyl phosphoryl cholesterol, chromanil ascorbic acid derivatives, and ascorbic acid/sialic acid derivatives), tocopherol or salts thereof and their derivatives (such as  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol,  $\delta$ -tocopherol,  $\epsilon$ -tocopherol,  $\alpha$ -tocopherylretinoate, aminomethylated tocopherol,

hydroxymethylated tocopherol, tocopheryl phosphate, tocopherol acetate, tocopherol nicotinate, tocopherol succinate, tocopherol linoleate, tocopherol orotate, DL- $\alpha$ -tocopherylglucoside, DL- $\alpha$ -tocopherylmaltoside, DL- $\beta$ -tocopherylglucoside, DL- $\beta$ -tocopherylmaltoside, DL- $\gamma$ -tocopherylglucoside, DL- $\gamma$ -tocopherylmaltoside, DL- $\delta$ -tocopherylglucoside, DL- $\delta$ -tocopherylmaltoside, D- $\alpha$ -tocopherylglucoside, D- $\alpha$ -tocopherylmaltoside, D- $\beta$ -tocopherylglucoside, D- $\beta$ -tocopherylmaltoside, D- $\gamma$ -tocopherylglucoside, D- $\gamma$ -tocopherylmaltoside, D- $\delta$ -tocopherylglucoside, D- $\delta$ -tocopherylmaltoside, L- $\alpha$ -tocopherylglucoside, L- $\alpha$ -tocopherylmaltoside, L- $\beta$ -tocopherylglucoside, L- $\beta$ -tocopherylmaltoside, L- $\gamma$ -tocopherylglucoside, L- $\gamma$ -tocopherylmaltoside, L- $\delta$ -tocopherylglucoside, L- $\delta$ -tocopherylmaltoside, 1-(sulphoethylamino)-3-( $\alpha$ -tocopheryl-6-yloxy)propan-2-ol, 1-(carboxypropylamino)-3-( $\alpha$ -tocopheryl-6-yloxy)propan-2-ol hydrochloride, S-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-hydroxypropyl]cystein, S-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-hydroxypropyl]- $\gamma$ -glutamyl cystenyl glycine, N-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-hydroxypropyl]aspartic acid, and N-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-hydroxypropyl]glutamic acid), tocotrienol or salts thereof and their derivatives (such as  $\alpha$ -tocotrienol,  $\beta$ -tocotrienol,  $\gamma$ -tocotrienol,  $\delta$ -tocotrienol, tocotrienol acetate, tocotrienol nicotinate, tocotrienol succinate, tocotrienol linoleate, and tocotrienol orotate), kojic acid and derivatives thereof (such as 2-methoxymethyl-hydroxy-4H-pyran-4-one, 2-ethoxymethyl-5-hydroxy-4H-pyran-4-one, 2-benzoyloxymethyl-5-hydroxy-4H-pyran-4-one, 2-cinnamoyloxymethyl-5-hydroxy-4H-pyran-

4-one, 2-phenoxyethyl-5-hydroxy-4H-pyran-4-one, a kojic acid glycoside, geranyl-geranyl-acetone, kojic acid monobutyrate, kojic acid monocaprate, kojic acid monopalmitate, kojic acid monostearate, kojic acid monocinnamate, kojic acid monobenzoate, kojic acid dibutyrate, kojic acid dipalmitate, kojic acid distearate, and kojic acid dioleate), oxybenzone, benzophenone, guaiiazulen, shikonin, an isoflavone glycoside (such as 6-o-  
 apiosylpuerarin-4'-o-glucoside, 6-o-glucosylpuerarin, 3'-hydroxypuerarin-4'-o-glucoside, and 6-o-apiosyl-3'-hydroxypuerarin), a  $\gamma$ -pyrone glycoside (such as maltol-3-o-(6'-o-apiosyl)-glucoside and maltol-3-o-(6'-o-apiosyl)-glucoside), isononylferulate, ellagic acid or salts thereof and their derivatives (such as 5,4-dimethyl ellagic acid, 3,3'-dimethyl ellagic acid, 3,3',4-trimethyl ellagic acid, 3,3',4,4'-tetramethyl-5-methoxy ellagic acid, 3-ethyl-4-methyl-5-hydroxy ellagic acid, and amritoside), rucinol, onjisaponin, Ophiopogonis saponin, ruscogenin, sericoside, asiaticoside, hederin, senegin, benzoic anilides (such as 4-hydroxy-N-(2-hydroxyphenyl)benzoic amide, 4-hydroxy-N-(3-hydroxyphenyl)benzamide, 4-hydroxy-N-(4-hydroxyphenyl)benzamide, 3,5-di-t-butyl-4-hydroxy-N-(4-hydroxyphenyl)benzamide, 3,5-di-t-butyl-4-hydroxy-N-(3-hydroxyphenyl)benzamide, and 3,5-di-t-butyl-4-hydroxy-N-(2-hydroxyphenyl)benzamide), diphenylpiralin, cyproheptadine, triprolidine, dimetindene, ozagrel, isothipendyl, iproheptine, homochlorcyclizine, alimemazine, bucillamine, oxotamide, vidarabine, xanthotoxol, placenta extract (derived from bovine, porcine, horse, sheep, or the like), almond extract, Phyllanthus emblica extract, ukyoyo extract, Atractylodes ovata



extract, *Atractylodes japonica* extract, konfuyou extract, *uncaria* extract, *gaigicya* extract, *kakojuyo* extract, *glycyrrhiza* extract, *Gardenia florida* extract, *kuranigean* extract, *Sophora flavescens* extract, *Scutellaria baicalensis* extract, wheat extract, rice extract, *coriaria* extract, *sidowaya* extract, *sanukyu* extract, *sanbitro* extract, *Cassia minosoides* extract, *silane* extract, *Cnidium officinale* extract, *senna* extract, *Inula britannica* extract, *Lythrum anceps* extract, *surigaten* extract, *Angelica decursiva* extract, *Coix lacryma-jobi* extract, *beach vitex* extract, *round-leaf vitex* extract, *Hamamelis virginiana* extract, *palm* extract, *Parietaria officinalis* extract, *safflower* extract, *Morus alba* extract, *Sophora flavescens* extract, *Iris gemanica* extract, *Iris florentina* extract, *Artemisia mongolia* extract, *yasyajitu* extract, *hongkong* extract, *Sanguisorba officinalis* extract, *yuzuriha* extract, *Polygonum multiflorum* extract, *fatsia* extract, etc.

[0047]

(12) Tyrosinase inhibitor

Ascorbic acid or salts thereof and their derivatives (such as phosphoric acid-magnesium L-ascorbate, ascorbyl palmitate, ascorbyl dipalmitate, ascorbic acid hydroxyproline phosphoric acid ester, 5-o- $\alpha$ -D-glucopyranosyl-L-ascorbic acid, an L-ascorbyl phosphate sodium salt, an L-ascorbyl phosphate potassium salt, an L-ascorbyl phosphate magnesium salt, an L-ascorbyl phosphate calcium salt, an L-ascorbyl phosphate aluminum salt, an L-ascorbyl sulfate sodium salt, an L-ascorbyl sulfate potassium salt, an L-ascorbyl sulfate magnesium salt, an L-ascorbyl sulfate calcium salt, an L-ascorbyl sulfate aluminum

salt, sodium L-ascorbate, potassium L-ascorbate, magnesium L-ascorbate, calcium L-ascorbate, aluminum L-ascorbate, 6-o- $\alpha$ -D-galactopyranosyl-L-ascorbic acid, 2-o- $\beta$ -D-galactopyranosyl-L-ascorbic acid, an L-ascorbyl phosphate magnesium salt, an L-ascorbyl phosphate sodium salt, an L-ascorbyl sulfate sodium salt, a 6-o-acylascorbyl phosphate sodium salt, a 6-o-acylascorbyl phosphate ammonium salt, a 6-o-acylascorbyl phosphate isopropanolamine salt, 3-o-isopropyl-L-ascorbic acid, a 6-o-alkylascorbyl phosphate potassium salt, a 6-o-alkylascorbyl phosphate calcium salt, a 6-o-alkylascorbyl phosphate barium salt, a 6-o-alkylascorbyl phosphate ammonium salt, a 6-o-alkylascorbyl phosphate monoethanolamine salt, a 6-o-alkylascorbyl phosphate diethanolamine salt, a 6-o-alkylascorbyl phosphate triethanolamine salt, a 6-o-alkylascorbyl phosphate monoisopropanolamine salt, a 6-o-alkylascorbyl phosphate diisopropanolamine salt, a 6-o-alkylascorbyl phosphate triisopropanolamine salt, 3-o-glycosyl-L-ascorbic acid, 6-o- $\beta$ -D-galactopyranosyl-L-ascorbic acid, ascorbic acid phosphoric acid cholesterol ester, L-ascorbyl palmitate, L-ascorbyl isopalmitate, L-ascorbyl dipalmitate, L-ascorbyl diisopalmitate, L-ascorbyl stearate, L-ascorbyl isostearate, L-ascorbyl distearate, L-ascorbyl diisostearate, L-ascorbyl myristate, L-ascorbyl isomyristate, L-ascorbyl dimyristate, L-ascorbyl diisomyristate, L-ascorbyl 2-ethylhexanoate, L-ascorbyl di-2-ethylhexanoate, L-ascorbyl-oleate, 2-o- $\alpha$ -D-glucosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltotriosyl-L-ascorbic acid, 3-o- $\alpha$ -D-glucosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltosyl-L-ascorbic acid, 2-o-

$\alpha$ -D-maltotriosyl-L-ascorbic acid, L-ascorbic acid tetraisopalmitic acid ester, L-ascorbic acid tetralauric acid ester, L-ascorbic acid tetra-2-ethylhexanoic acid ester, L-ascorbic acid tetraoleic acid ester, 5,6-isopropylidene-L-ascorbic acid, retinol L-ascorbate, L-ascorbic acid-DL-tocopherol phosphoric acid ester, L-3-o-ethylascorbic acid, L-ascorbic acid tristearate, L-ascorbic acid tripalmitate, L-ascorbic acid trioleate, L-ascorbic acid triphosphoric acid ester, 2-o-ascorbyl cinnamate, 2-o-ascorbyl ferulate, 2-o-ascorbyl caffeate, 2-O-ascorbyl cinnapate, 2-o-[6-palmitoylascorbyl]-4'-acetoxyferulate, DL- $\alpha$ -tocopherol-2-L-ascorbic acid phosphoric acid diester, ascorbic acid inositol conjugate derivatives, phosphoamide ascorbate derivatives, ascorbic acid arbutin conjugates, ascorbyl phosphoryl cholesterol, chromanil ascorbic acid derivatives, and ascorbyl sialate derivatives), hydroquinone, salts thereof, and their derivatives (e.g., hexose glycosides such as hydroquinone  $\alpha$ -D-glucose, hydroquinone  $\beta$ -D-glucose, hydroquinone  $\alpha$ -L-glucose, hydroquinone  $\beta$ -L-glucose, hydroquinone  $\alpha$ -D-galactose, hydroquinone  $\beta$ -D-galactose, hydroquinone  $\alpha$ -L-galactose, and hydroquinone  $\beta$ -L-galactose; pentose glycosides such as hydroquinone  $\alpha$ -D-ribose, hydroquinone  $\beta$ -D-ribose, hydroquinone  $\alpha$ -L-ribose, hydroquinone  $\beta$ -L-ribose, hydroquinone  $\alpha$ -D-arabinose, hydroquinone  $\beta$ -D-arabinose, hydroquinone  $\alpha$ -L-arabinose, and hydroquinone  $\beta$ -L-arabinose; amino sugar glycosides such as hydroquinone  $\alpha$ -D-glucosamine, hydroquinone  $\beta$ -D-glucosamine, hydroquinone  $\alpha$ -L-glucosamine, hydroquinone  $\beta$ -L-glucosamine, hydroquinone  $\alpha$ -D-galactosamine, hydroquinone  $\beta$ -D-galactosamine,

hydroquinone  $\alpha$ -L-galactosamine, and hydroquinone  $\beta$ -L-galactosamine; hydroquinone glycosides such as uronic acid glycosides, for example, hydroquinone  $\alpha$ -D-glucuronate, hydroquinone  $\beta$ -D-glucuronic acid, hydroquinone  $\alpha$ -L-glucuronate, hydroquinone  $\beta$ -L-glucuronate, hydroquinone  $\alpha$ -D-galacturonate, hydroquinone  $\beta$ -D-galacturonate, hydroquinone  $\alpha$ -L-galacturonate, and hydroquinone  $\beta$ -L-galacturonate; and hydroquinone hydroxyalkylether glycosides such as hydroquinone benzyl ether, 4- $\beta$ -D-glucopyranosyloxy-1-(4-hydroxyphenoxy)butane, 5- $\beta$ -D-glucopyranosyloxy-1-(4-hydroxyphenoxy)pentane, 6- $\beta$ -D-glucopyranosyloxy-1-(4-hydroxyphenoxy)hexane, 2- $\beta$ -D-glucopyranosyloxy-1-(4-hydroxyphenoxy)propane, 2- $\beta$ -D-glucopyranosyloxy-1-(4-hydroxyphenoxy)butane, and 2- $\beta$ -D-glucopyranosyloxy-1-(4-hydroxyphenoxy)propan-3-ol), kojic acid or salts thereof and their derivatives (such as 2-methoxymethyl-4-hydroxy-4H-pyran-4-one, 2-ethoxymethyl-5-hydroxy-4H-pyran-4-one, 2-benzoyloxymethyl-5-hydroxy-4H-pyran-4-one, 2-cinnamoyloxymethyl-5-hydroxy-4H-pyran-4-one, 2-phenoxyethyl-5-hydroxy-4H-pyran-4-one, kojic acid glycoside, geranyl geranyl acetone, kojic acid monobutylate, kojic acid monocaprate, kojic acid monopalmitate, kojic acid monostearate, kojic acid monocinnamate, kojic acid monobenzoate, kojic acid dibutyrate, kojic acid dipalmitate, kojic acid distearate, and kojic acid dioleate), tocopherol or salts thereof and their derivatives (such as  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol,  $\delta$ -tocopherol,  $\epsilon$ -tocopherol,  $\alpha$ -tocopheryl retinoate, aminomethylated tocopherol, hydroxymethylated tocopherol, tocopheryl phosphate ester, tocopherol acetate, tocopherol nicotinate, tocopherol succinate,

tocopherol linoleate, tocopherol orotate, DL- $\alpha$ -  
 tocopherylglucoside, DL- $\alpha$ -tocopherylmaltoside, DL- $\beta$ -  
 tocopherylglucoside, DL- $\beta$ -tocopherylmaltoside, DL- $\gamma$ -  
 tocopherylglucoside, DL- $\gamma$ -tocopherylmaltoside, DL- $\delta$ -  
 tocopherylglucoside, DL- $\delta$ -tocopherylmaltoside, D- $\alpha$ -  
 tocopherylglucoside, D- $\alpha$ -tocopherylmaltoside, D- $\beta$ -  
 tocopherylglucoside, D- $\beta$ -tocopherylmaltoside, D- $\gamma$ -  
 tocopherylglucoside, D- $\gamma$ -tocopherylmaltoside, D- $\delta$ -  
 tocopherylglucoside, D- $\delta$ -tocopherylmaltoside, L- $\alpha$ -  
 tocopherylglucoside, L- $\alpha$ -tocopherylmaltoside, L- $\beta$ -  
 tocopherylglucoside, L- $\beta$ -tocopherylmaltoside, L- $\gamma$ -  
 tocopherylglucoside, L- $\gamma$ -tocopherylmaltoside, L- $\delta$ -  
 tocopherylglucoside, L- $\delta$ -tocopherylmaltoside, L-  
 (sulfoethylamino)-3-( $\alpha$ -tocopheryl-6-yloxy)propan-2-ol, 1-  
 (carboxypropylamino)-3-( $\alpha$ -tocopheryl-6-yloxy)propan-2-ol  
 hydrochloride, S-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-  
 hydroxypropyl]cysteine, S-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-  
 hydroxypropyl]- $\gamma$ -glutamyl cystenyl glycine, N-[3-( $\alpha$ -tocopheryl-6-  
 yloxy)-2-hydroxypropyl]aspartic acid, and N-[3-( $\alpha$ -tocopheryl-6-  
 yloxy)-2-hydroxypropyl]glutamic acid), tocotrienol or salts  
 thereof and their derivatives (such as  $\alpha$ -tocotrienol,  $\beta$ -  
 tocotrienol,  $\gamma$ -tocotrienol,  $\delta$ -tocotrienol, tocotrienol acetate,  
 tocotrienol nicotinate, tocotrienol succinate, tocotrienol  
 linoleate, and tocotrienol orotate), N-acetyltyrosine or salts  
 thereof and their derivatives, glutathione or salts thereof and  
 their derivatives, ellagic acid or salts thereof and their  
 derivatives (such as 3,4-dimethyl ellagic acid, 3,3'-  
 dimethylellagic acid, 3,3',4-trimethylellagic acid, 3,3',4,4'-

tetramethyl-5-methoxyellagic acid, 3-ethyl-4-methyl-5-hydroxyellagic acid, and amritoside), isonitrile antibiotics such as isonitrin A, isonitrin B, isonitrin C, isonitrin D, isonitrinic acid E, isonitrinic acid F, derumadein, and toricobilidein, orsellinic acid derivatives (such as orsellinic acid, orsellinic acid ethyl ester orcinol, p-geranyl orsellinic acid, p-geranyl orsellinic acid ethyl ester geranyl orcinol, p-farnesyl orsellinic acid, p-farnesyl orsellinic acid ethyl ester farnesyl orcinol, p-dodecanyl orsellinic acid, p-dodecanyl orsellinic acid ethyl ester dodecanyl orcinol, p-tetradecanyl orsellinic acid, p-tetradecanyl orsellinic acid ethyl ester tetradecanyl orcinol, p-hexadecanyl orsellinic acid, p-hexadecanyl orsellinic acid ethyl ester hexadecanyl orcinol, p-undecanyl orsellinic acid, p-undecanyl orsellinic acid ethyl ester undecanyl orcinol, p-tridecanyl orsellinic acid, p-tridecanyl orsellinic acid ethyl ester undecanyl orcinol, p-pentadecanyl orsellinic acid, p-pentadecanyl orsellinic acid ethyl ester pentadecanyl orcinol, ethylhexyl orsellinic acid, p-ethylhexyl orsellinic acid ethyl ester ethylhexyl orcinol, p-cyclohexylmethyl orsellinic acid, p-cyclohexylmethyl orsellinic acid ethyl ester cyclohexylmethyl orcinol, p-hydroxyethylhexyl orsellinic acid methyl ester, and p-hydroxyethylhexyl orsellinic acid hydroxyethylhexyl orcinol), umbellic acid, brefeldin, oxydesberatrol, resorcinol derivatives (4-cyclohexyl resorcinol), 3-hydroxyketone compounds (such as 1,5-bis(p-hydroxyphenyl)-2-hydroxypentan-4-one, 1,5-bis(o,p-dihydroxyphenyl)-2-hydroxypentan-4-one, and 1,5-bis(p-hydroxyphenyl-m-methoxyphenyl)-2-hydroxypentan-4-one), 1,3-diketone compounds

(such as 1,5-bis(p-hydroxyphenyl)-2,4-pentanedione, 1,5-bis(o,p-dihydroxyphenyl)-2,4-pentanedione, and 1,5-bis(p-hydroxyphenyl-m-methoxyphenyl)-2,4-pentanedione), bishydroxybenzylamides,  $\gamma$ -aminobutyric acid and derivatives thereof (such as N-methyl- $\gamma$ -aminobutyric acid, N-dimethyl- $\gamma$ -aminobutyric acid, and  $\gamma$ -aminobutyric acid oleyl ester), placenta extracts, lucinol, silk extract, acacia extract, acelora extract, Abutilon theophrasti extract, Betula pendula extract, quercus extract, chestnut extract, Plectranthus kameba extract, Plectranthus trichocarpus extract, Plectranthus japonicus extract, Oenanthe javanica extract, Fagopyrum esculentum extract, Durvillea extract, Capsella bursa-pastoris extract, Eupatorium fortunei extract, Matricaria chamomilla L. extract, Mullberry extract, Gardenia florida extract, Angelica acutiloba extract, Sanguisorba officinalis extract, Sophora flavescens extract, mugwort extract, Lonicera japonica extract, Phellodendron amurense extract, Houttuynia cordata extract, Poria cocos extract, Coix lachryma-jobi extract, hops extract, Crataegus cuneata extract, Achillea millefolium extract, althaea extract, Cinnamomum cassia extract, Vitex rotundifolia extract, Hamamelis virginiana extract, Morus bombycis extract, Platycodon grandiflorum extract, Cuscuta chinensis extract, Euphorbia lathyris extract, Belamcanda chinensis rhizome extract, Ephedra sinica extract, Cnidium officinale extract, Aralia cordata extract, Bupleurum falcatum extract, Ledebouriella seseloides extract, Glehnia littoralis extract, Scutellaria baicalensis extract, Paeonia suffruticosa extract, Paeonia lactifolia extract, Pueraria lobata extract, Glycyrrhiza uralensis extract, Galla rhois extract, Aloe

arborescens extract, Cimicifuga simplex extract, Carthamus tinctorius extract, green tea extract, black tea extract, Acacia catechu extract, and so on.

[0048]

(13) Melanocyte melanogenesis inhibitor

Lobeline or lobeline derivatives, liquiritin derivatives (such as liquiritin- $\alpha$ -glucoside and liquiritin- $\alpha$ -maltoside), phenylchroman derivatives, chromone derivatives (such as 2-butylchromone, 2-pentylchromone, 2-heptylchromone, 2-nonylchromone, 2-hexadecylchromone, 2-(1-ethylpentyl)chromone, 2-butyl-7-methoxychromone, 2-pentyl-7-methoxychromone, 2-heptyl-7-methoxychromone, 2-nonyl-7-methoxychromone, 2-pentadecyl-7-methoxychromone, 2-(1-ethylpentyl)-7-methoxychromone, 7-hydroxy-2-methylchromone, 7-hydroxy-2-butylchromone, 7-hydroxy-2-pentylchromone, 7-hydroxy-2-heptylchromone, 7-hydroxy-2-nonylchromone, 7-hydroxy-2-pentadecylchromone, and 7-hydroxy-2-(1-ethylpentyl)chromone), azelaic acid derivatives (such as azelaic acid monoalkyl ester and azelaic acid dialkyl ester), phosphatidylglucosamine, lysophosphatidylglucosamine, phenylhydroquinone, 3- $\beta$ -D-glucopyranosyl manool, 3- $\beta$ -D-maltopyranosyl manool, substituted amino acid derivatives (such as DL-N-formyl-3-(1-naphthyl)alanine, DL-N-acetyl-3-(1-naphthyl)alanine, DL-N-propionyl-3-(1-naphthyl)alanine, DL-N-butyryl-3-(1-naphthyl)alanine, DL-N-isobutyryl-3-(1-naphthyl)alanine, DL-N-valeryl-3-(1-naphthyl)alanine, DL-N-isovaleryl-3-(1-naphthyl)alanine, DL-N-(2-methylvaleryl)-3-(1-naphthyl)alanine, DL-N-(3-methylvaleryl)-3-(1-naphthyl)alanine, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine, DL-N-t-



butylacetyl-3-(1-naphthyl)alanine, DL-N-pivaloyl-3-(1-naphthyl)alanine, DL-N-caproyl-3-(1-naphthyl)alanine, DL-N-(2-ethylhexanoyl)-3-(1-naphthyl)alanine, DL-N-(2-methylhexanoyl)-3-(1-naphthyl)alanine, DL-N-heptanoyl-3-(1-naphthyl)alanine, DL-N-octanoyl-3-(1-naphthyl)alanine, DL-N-(2-propylpentanoyl)-3-(1-naphthyl)alanine, DL-N-nonanoyl-3-(1-naphthyl)alanine, DL-N-decanoyl-3-(1-naphthyl)alanine, DL-N-undecanoyl-3-(1-naphthyl)alanine, DL-N-dodecanoyl-3-(1-naphthyl)alanine, DL-N-tridecanoyl-3-(1-naphthyl)alanine, DL-N-tetradecanoyl-3-(1-naphthyl)alanine, DL-N-pentadecanoyl-3-(1-naphthyl)alanine, DL-N-hexadecanoyl-3-(1-naphthyl)alanine, DL-N-heptadecanoyl-3-(1-naphthyl)alanine, DL-N-octadecanoyl-3-(1-naphthyl)alanine, DL-N-nonadecanoyl-DL-3-(1-naphthyl)alanine, DL-N-icosanoyl-3-(1-naphthyl)alanine, DL-N-acroyl-3-(1-naphthyl)alanine, DL-N-crotonyloyl-3-(1-naphthyl)alanine, DL-N-methacryloyl-3-(1-naphthyl)alanine, DL-N-vinylacetyl-3-(1-naphthyl)alanine, DL-N-cyclopropanoyl-3-(1-naphthyl)alanine, DL-N-(2-pentenoyl)-3-(1-naphthyl)alanine, DL-N-(4-pentenoyl)-3-(1-naphthyl)alanine, DL-N-(2-hexenoyl)-3-(1-naphthyl)alanine, DL-N-(3-hexenoyl)-3-(1-naphthyl)alanine, DL-N-(2-methyl-3-pentenoyl)-3-(1-naphthyl)alanine, DL-N-cyclohexenoyl-3-(1-naphthyl)alanine, DL-N-(10-undecenoyl)-3-(1-naphthyl)alanine, DL-N-linoleyl-3-(1-naphthyl)alanine, DL-N-hydroxyacetyl-3-(1-naphthyl)alanine, DL-N-(6-hydroxycaproyl)-3-(1-naphthyl)alanine, DL-N-(8-hydroxyoctanoyl)-3-(1-naphthyl)alanine, DL-N-(9-hydroxynonanoyl)-3-(1-naphthyl)alanine, DL-N-(10-hydroxydecanoyl)-3-(1-naphthyl)alanine, DL-N-(11-hydroxyundecanoyl)-3-(1-naphthyl)alanine, DL-N-(12-

hydroxydecanoyl)-3-(1-naphthyl)alanine, DL-N-benzoyl-3-(1-naphthyl)alanine, DL-N-(2-hydroxybenzoyl)-3-(1-naphthyl)alanine, DL-N-(3-hydroxybenzoyl)-3-(1-naphthyl)alanine, DL-N-(4-hydroxybenzoyl)-3-(1-naphthyl)alanine, DL-N-(o-toluy1)-3-(1-naphthyl)alanine, DL-N-(m-toluy1)-3-(1-naphthyl)alanine, DL-N-(p-toluy1)-3-(1-naphthyl)alanine, DL-N-(1-naphthoyl)-3-(1-naphthyl)alanine, DL-N-(2-naphthoyl)-3-(1-naphthyl)alanine, DL-N-(2-carboxybenzoyl)-3-(1-naphthyl)alanine, DL-N-(3-carboxybenzoyl)-3-(1-naphthyl)alanine, DL-N-(4-carboxybenzoyl)-3-(1-naphthyl)alanine, DL-N-(2-picolylol)-3-(1-naphthyl)alanine, DL-N-(3-picolylol)-3-(1-naphthyl)alanine, DL-N-(4-picolylol)-3-(1-naphthyl)alanine, DL-N-phenylacetyl-3-(1-naphthyl)alanine, DL-N-(2-phenylpropanoyl)-3-(1-naphthyl)alanine, DL-N-(3-phenylbutyryl)-3-(1-naphthyl)alanine, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine, DL-N-valeryl-3-(1-naphthyl)alanine, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine amide, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine methyl ester, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine ethyl ester, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine propyl ester, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine-N-butyl ester, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine pentyl ester, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine isopropyl ester, DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine isobutyl ester, and DL-N-(4-methylvaleryl)-3-(1-naphthyl)alanine-t-butyl ester), benzolactam derivatives, indolactam derivatives, cedrol, guaiol, 1-(4-hydroxyphenylthio)-2-propanol,  $\beta$ -lactoglobulin, 2-methoxy-5-methylphenol, 5-ethyl-2-methoxyphenol, 5-N-propyl-2-methoxyphenol, 5-N-butyl-2-methoxyphenol, 5-N-hexyl-2-

methoxyphenol, 5-N-heptyl-2-methoxyphenol, 5-N-decyl-2-methoxyphenol, 5-(1,1-dimethylpropyl)-2-methoxyphenol, 5-(1,1-dimethylbutyl)-2-methoxyphenol, 5-(1,1-dimethylethyl)-2-methoxyphenol, 2-methoxy-5-(1-methylpentyl)phenol, 2-methoxy-5-(1-methylhexyl)phenol, 2-methoxy-5-(3-methylhexyl)phenol, 2-methoxy-5-(6-methylheptyl)phenol, 5-(1,3-dimethylheptyl)-2-methoxyphenol, mulberrin, ferruginol, sugiol, cryptojaponol, 1,5-bis[p-hydroxyphenyl]-1,4-pentadien-3-one, 1,5-bis[o-hydroxyphenyl]-1,4-pentadien-3-one, 1,5-bis[2,4-dihydroxyphenyl]-1,4-pentadien-3-one, 1,5-bis[3-methoxy-4-hydroxyphenyl]-1,4-pentadien-3-one, haginine, agrimophol, agrimol, hydrangenol and derivatives thereof, and alkylresorcinol and derivatives thereof (such as 4-N-butylresorcinol), aristolone, calamenenes (such as calamenene, 7-hydroxycalamenene, 5-hydroxycalamenene, and 7-methoxycalamenene), trans-umbellic acid, N- $\alpha$ -benzoyl-L-arginine, N- $\alpha$ -benzoyl-L-arginine ethyl ester, N- $\alpha$ -benzoyl-L-arginine ethyl ester, 5-methyl-2(3H)-furanone, 2-buten-4-olide, 2-hydroxymethylfuran, 2,5-dimethyl-4-hydroxy-3(2H)-furanone, 2-formylfuran, 3-formylfuran, methyl  $\alpha$ -furyl ketone, furfuryl acetate, 2-hydroxy-3-methyl-2-cyclopenten-1-one, 2-hydroxy-3,5-dimethyl-2-cyclopenten-1-one, 2,5-dimethyl-4-hydroxy-3(2H)-thiophenone, 2-hydroxy-3-ethyl-2-cyclopenten-1-one, tetronic acid, pentanedione, iminodibenzyls (such as 2,2'-iminodibenzyl, imipramine, imipramine hydrochloride, desipramine, desipramine hydrochloride, chlorimipramine, and trimipramine), dibenzocycloheptadienes (such as amitriptyline, amitriptyline hydrochloride, nortriptyline, and noxipityline),

tetrahydrocopalol glycoside (such as ketotifen fumarate, labda-  
 8(17),13-dien-15-ol, tetrahydromanol, tetrahydrocopalol,  
 tetrahydrocopalol glucoside, tetrahydrocopalol galactoside,  
 tetrahydrocopalol maltoside, tetrahydrocopalol cellobioside, and  
 tetrahydrocopalol maltotrioside), spiro ether compounds,  
 piochelin, phenothiazine compounds, promethazine, alimemazine,  
 alimemazine tartrate, triflupromazine, levomepromazine,  
 chlorpromazine, cyclandelate, 4-carboxymethyloxybenzoic acid, 4-  
 carboxymethyloxy-2-hydroxybenzoic acid, 3-(3-carboxypropyl-1-  
 oxy)-2-hydroxybenzoic acid, 4-(3-carboxypropyl-1-oxy)benzoic  
 acid, 4-(3-carboxypropyl-1-oxy)-2-hydroxybenzoic acid, 4-(3-  
 carboxypropyl-1-oxy)-2-methoxybenzoic acid, 5-(3-carboxypropyl-  
 1-oxy)-2-hydroxybenzoic acid, 4-(5-carboxypentyl-1-oxy)-2-  
 hydroxybenzoic acid, 6-(3-carboxypropyl-1-oxy)-2-hydroxybenzoic  
 acid, 4-(10-carboxydecan-1-oxy)-2-hydroxybenzoic acid, 4-(10-  
 carbamoyldecan-1-oxy)-2-hydroxybenzoic acid, 4-(4-hydroxybutyl-  
 1-oxy)benzoic acid, 4-(4-hydroxybutyl-1-oxy)-2-hydroxybenzoic  
 acid, 4-(4-acetoxybutyl-1-oxy)benzoic acid, 4-(4-acetoxybutyl-1-  
 oxy)-2-hydroxybenzoic acid, 4-(3-ethoxycarbonylpropyl-1-oxy)-2-  
 hydroxybenzoic acid, 3-(2,3-dihydroxypropyl-1-oxy)-2-  
 hydroxybenzoic acid, 4-(4-methoxybutyl-1-oxy)-2-hydroxybenzoic  
 acid, 4-(2,3-dihydroxypropyl-1-oxy)-2-hydroxybenzoic acid, 4-  
 carboxymethyloxy-2-hydroxybenzoic acid, 3-(3-carboxypropyl-1-  
 oxy)-2-hydroxybenzoic acid, 4-(3-carboxypropyl-1-oxy)-2-  
 hydroxybenzoic acid, 5-(3-carboxypropyl-1-oxy)-2-hydroxybenzoic  
 acid, 6-(3-carboxypropyl-1-oxy)-2-hydroxybenzoic acid, 4-(5-  
 carboxypentyl-1-oxy)-2-hydroxybenzoic acid, 4-(4-hydroxybutyl-1-  
 oxy)-2-hydroxybenzoic acid, 4-(10-carboxydecan-1-oxy)-2-

hydroxybenzoic acid, hydroxytrimethyl cyclohexanes (such as monosaccharide glycoside, disaccharide glycoside, or trisaccharide glycoside of, for example, 2-hydroxy-4-(2,2,6-trimethyl-1-yl-cyclohexane)butane, 4-(2,2,6-trimethyl-1-yl-cyclohexane)-1-butene, 4-(2,2,6-trimethyl-1-yl-cyclohexane)-2-butene, 4-(2,2,6-trimethyl-1-yl-cyclohexane)butane, 3-methyl-3-hydroxy-5-(2,2,6-trimethyl-1-yl-cyclohexane)pentane, 3-methyl-1-hydroxy-5-(2,2,6-trimethyl-1-yl-cyclohexane)pentane, 3-methyl-5-(2,2,6-trimethyl-1-yl-cyclohexane)pentane, 3-methyl-1-hydroxy-5-(2,2,6-trimethyl-1-yl-cyclohexane)-3-pentene, 3-methyl-3-hydroxy-5-(2,2,6-trimethyl-1-yl-cyclohexane)-1-pentene, 3-methyl-1-hydroxy-5-(2,2,6-trimethyl-1-yl-cyclohexane)-2-pentene, and 2-hydroxy-4-(2,2,6-trimethyl-1-yl-cyclohexane)butane), escinol, monosaccharide glycoside, disaccharide glycoside, or trisaccharide glycoside of para-hydroxycinnamic acid-4-(2,2,6-trimethyl-yl-cyclohexane)-2-butyl ester, onjisaponin, Ophiopogonis saponin, ruscogenin, sericoside, asiaticoside, hederin, senegin, 4-(2,2,6-trimethyl-1-yl-cyclohexane)-2-keto-butane, 4-(2,2,6-trimethyl-1-yl-6-cyclohexene)-2-keto-butane, 4-(2,2,6-trimethyl-1-yl-cyclohexane)-2-keto-3-butene, 4-(2,2,6-trimethyl-1-yl-6-cyclohexene)-2-keto-3-butene ( $\beta$ -ionone), L-p-hydroxyphenylglycine, D-p-hydroxyphenylglycine, N-benzyloxycarbonyl-L-p-hydroxyphenylglycine, N-benzyloxycarbonyl-D-p-hydroxyphenylglycine, N-benzoyl-L-p-hydroxyphenylglycine, N-benzoyl-D-p-hydroxyphenylglycine, N-(p-methoxybenzoyl)-L-p-hydroxyphenylglycine, N-(p-methoxybenzoyl)-D-p-hydroxyphenylglycine, N-(p-hydroxybenzoyl)-L-p-hydroxyphenylglycine, N-(p-hydroxybenzoyl)-D-p-

hydroxyphenylglycine, N-acetyl-L-p-hydroxyphenylglycine, N-acetyl-D-p-hydroxyphenylglycine, N-acetyl-L-p-hydroxyphenylglycine ethyl ester, N-acetyl-D-p-hydroxyphenylglycine ethyl ester, N-acetyl-L-p-hydroxyphenylglycine amide, N-acetyl-D-p-hydroxyphenylglycine amide, L-p-methoxyphenylglycine, D-p-methoxyphenylglycine, L-p-methoxyphenylglycine hydrochloride, D-p-methoxyphenylglycine hydrochloride, 4-hydroxy-3-methoxy-L-phenylglycine, 4-hydroxy-3-methoxy-D-phenylglycine, L-p-hydroxyphenylglycine ethyl amide, D-p-hydroxyphenylglycine ethyl amide, N-tert-butoxycarbonyl-L-p-hydroxyphenylglycine, N-tert-butoxycarbonyl-D-p-hydroxyphenylglycine, N-tert-butoxycarbonyl-L-p-methoxyphenylglycine, N-tert-butoxycarbonyl-D-p-methoxyphenylglycine, N-9-fluorenylmethyloxycarbonyl-L-p-methoxyphenylglycine, N-9-fluorenylmethyloxycarbonyl-D-p-methoxyphenylglycine, N-9-fluorenylmethyloxycarbonyl-L-p-methoxyphenylglycine benzyl ester hydrochloride, N-9-fluorenylmethyloxycarbonyl-D-p-methoxyphenylglycine benzyl ester hydrochloride, L-p-hydroxyphenylglycine amide, D-p-hydroxyphenylglycine amide, L-p-hydroxyphenylglycine allyl ester p-toluenesulfonate, D-p-hydroxyphenylglycine allyl ester p-toluenesulfonate, L-p-hydroxyphenylglycine benzyl ester p-toluenesulfonate, D-p-hydroxyphenylglycine benzyl ester p-toluenesulfonate, L-p-hydroxyphenylglycine ethyl ester, D-p-hydroxyphenylglycine ethyl ester, L-p-hydroxyphenylglycine ethyl ester hydrochloride, D-p-hydroxyphenylglycine ethyl ester hydrochloride, L-p-hydroxyphenylglycine methyl ester, and D-p-hydroxyphenylglycine methyl ester, 1,3-diallylindane-2-

carboxylic acids, stachyocins, pheophorbide derivatives,  
 eleutherin, isoeleutherin, 4- $\beta$ -hydroxyisoeleutherin, eleutherinol,  
 spiroketal derivatives (such as 2-(2,4-hexadiynylidene)-1,6-  
 dioxaspiro[4.5]deca-3-ene, 2-(2-hexynylidene)-1,6-  
 dioxaspiro[4.4]nona-3-ene, 2-((4-methylphenyl)methylidene)-6,6-  
 dioxaspiro[4.4]nona-3-ene, 2-(2-hexenylidene)-6,6-  
 dioxaspiro[4.5]deca-3-ene, 2-(2-hexenylidene)-1,6-  
 dioxaspiro[4.4]nona-3-ene, 2-hexyl-1,6-dioxaspiro[4.4]nonane, 2-  
 (2-hexenyl)-1,6-dioxaspiro[4.4]nonane, 2-(2-hexynyl)-1,6-  
 dioxaspiro[4.4]nonane, 2-pentyl-1,6-dioxaspiro[4.4]nonane, 1,6-  
 dioxaspiro[4.4]nonane, 1,6-dioxaspiro[4.5]decane, 1,7-  
 dioxaspiro[5.5]undecane, 2,3-benzo-4,4-dimethyl-1,6-  
 dioxaspiro[4.4]nonane, 3,4-benzo-2-pentyl-1,6-  
 dioxaspiro[4.4]nonane, 3,4-benzo-2-hexyl-1,6-  
 dioxaspiro[4.4]nonane, 3,4-benzo-2-octyl-1,6-  
 dioxaspiro[4.4]nonane, 2-hexyl-9,9-dimethyl-1,6-  
 dioxaspiro[4.4]nonane, and 2-(2,4-hexadiynylidene)-1,6-  
 dioxaspiro[4.4]nona-3-ene), malvalic acid, phosphonic acid  
 derivatives or salts thereof, aspergillomarasmine,  
 aminophosphonic acid derivatives or salts thereof,  
 diphenhydramine or salts thereof, pregnenolone or derivatives  
 thereof, lutein, farnesyl isopropanol derivatives,  
 hexahydrofarnesyl acetone, 4-benzoylamino-2-hydroxybenzoic acid,  
 5-benzoylamino-2-hydroxybenzoic acid, 4-benzoylamino-2-hydroxybenzoic acid,  
 4-(1-naphthoylamino)-2-hydroxybenzoic acid, 5-(1-  
 naphthoylamino)-2-hydroxybenzoic acid, 4-(2-naphthoylamino)-2-  
 hydroxybenzoic acid, 5-(2-naphthoylamino)-2-hydroxybenzoic acid,  
 4-(1-naphthoylamino)benzoic acid, 4-(2-naphthoylamino)benzoic

acid, 4-phenylaminocarbonylbenzoic acid, 4-phenylaminocarbonyl-  
 2-hydroxybenzoic acid, 5-phenylaminocarbonyl-2-hydroxybenzoic  
 acid, 4-(1-naphthylaminocarbonyl)benzoic acid, 4-(1-  
 naphthylaminocarbonyl)-2-hydroxybenzoic acid, 5-(1-  
 naphthylaminocarbonyl)-2-hydroxybenzoic acid, 4-(2-  
 naphthylaminocarbonyl)benzoic acid, 4-(2-naphthylaminocarbonyl)-  
 2-hydroxybenzoic acid, 5-(2-naphthylaminocarbonyl)-2-  
 hydroxybenzoic acid, hexahydrofarnesyl isopropanol derivatives,  
 borneol-p-hydroxycinnamic acid ester glucoside, borneol-p-  
 hydroxycinnamic acid ester maltoside, borneol-p-hydroxycinnamic  
 acid ester maltotrioside, cinnamic acid-4-(2,2,6-trimethyl-yl-  
 cyclohexane)-2-butyl ester derivatives, 2,4-  
 dihydroxybenzophenone, 1-(2,4-dihydroxyphenyl)-ethanone(2',4'-  
 dihydroxyacetophenone), 1-(2,4-dihydroxyphenyl)-1-  
 propanone(2',4'-dihydroxypropiophenone), 1-(2,4-  
 dihydroxyphenyl)-1-butanone, 1-(2,4-dihydroxyphenyl)-1-pentanone,  
 1-(2,4-dihydroxyphenyl)-1-hexanone, 1-(2,4-dihydroxyphenyl)-1-  
 heptanone, 1-(2,4-dihydroxyphenyl)-1-octanone, 1-(2,4-  
 dihydroxyphenyl)-1-nonanone, 1-(2,4-dihydroxyphenyl)-1-decanone,  
 1-(2,4-dihydroxyphenyl)-1-undecanone, 1-(2,4-dihydroxyphenyl)-1-  
 dodecanone, 1-(2,4-dihydroxyphenyl)-1-tetradecanone, 1-(2,4-  
 dihydroxyphenyl)-1-hexadecanone, 1-(2,4-dihydroxyphenyl)-1-  
 octadecanone, 1-(2-hydroxy-4-methoxyphenyl)-ethanone(2'-hydroxy-  
 4'-methoxy acetophenone), 1-(2-hydroxy-4-methoxyphenyl)-1-  
 propanone(2'-hydroxy-4'-methoxypropiophenone), 1-(2-hydroxy-4-  
 methoxyphenyl)-1-butanone, 1-(2-hydroxy-4-methoxyphenyl)-1-  
 pentanone, 1-(2-hydroxy-4-methoxyphenyl)-1-hexanone, 1-(2-  
 hydroxy-4-methoxyphenyl)-1-heptanone, 1-(2-hydroxy-4-



methoxyphenyl)-1-octanone, 1-(2-hydroxy-4-methoxyphenyl)-1-  
nonanone, 1-(2-hydroxy-4-methoxyphenyl)-1-decanone, 1-(2-  
hydroxy-4-methoxyphenyl)-1-undecanone, 1-(2-hydroxy-4-  
methoxyphenyl)-1-dodecanone, 1-(2-hydroxy-4-methoxyphenyl)-1-  
tetradecanone, 1-(2-hydroxy-4-methoxyphenyl)-1-hexadecanone, 1-  
(2-hydroxy-4-methoxyphenyl)-1-octadecanone, 1-(4-hydroxy-2-  
methoxyphenyl)-ethanone(4'-hydroxy-2'-methoxyacetophenone), 1-  
(4-hydroxy-2-methoxyphenyl)-1-propanone(4'-hydroxy-2'-  
methoxypropiophenone), 1-(2,4-dimethoxyphenyl)-ethanone(2',4'-  
dimethoxyacetophenone), 1-(2,4-dimethoxyphenyl)-1-  
propanone(2',4'-dimethoxypropiophenone), lactone derivatives  
(such as 1,6-dioxaspiro[4.4]nonane-2,7-dione, 1,6-  
dioxaspiro[4.5]decane-2,7-dione, 4-tridecanolide, 4-dodecanolide,  
4-undecanolide, 4-decanolide, 4-nonanolide, 4-octanolide, 4-  
heptanolide, 5-dodecanolide, 5-undecanolide, 5-decanolide, 5-  
nonanolide, 5-octanolide, 2-undecen-4-olide, 2-decen-4-olide, 2-  
nonen-4-olide, 2-hepten-4-olide, 2-undecen-5-olide, 2-decen-5-  
olide, 2-nonen-5-olide, 2-octen-5-olide, 4-methyl-4-dodecanolide,  
4-methyl-4-undecanolide, 4-methyl-4-decanolide, 4-methyl-4-  
nonanolide, 4-methyl-4-heptanolide, 5-methyl-5-dodecanolide, 5-  
methyl-5-undecanolide, 5-methyl-5-decanolide, 5-methyl-5-  
nonanolide, 5-methyl-5-octanolide, 2-methoxycarbonyl-4-  
dodecanolide, 2-methoxycarbonyl-4-undecanolide, 2-  
methoxycarbonyl-4-decanolide, 2-methoxycarbonyl-4-nonanolide, 2-  
methoxycarbonyl-4-heptanolide, 2-methoxycarbonyl-5-undecanolide,  
2-methoxycarbonyl-5-decanolide, 2-methoxycarbonyl-5-nonanolide,  
2-methoxycarbonyl-5-octanolide, 2-allyl-4-undecanolide, 2-allyl-  
5-decanolide, 2-allyl-4-nonanolide, 2-pentyl-4-undecanolide, 2-

pentyl-4-nonanolide, 2-methyl-4-undecanolide, 2-methyl-4-nonanolide, 2-(4-hydroxybutyl)-4-undecanolide, 2-(4-hydroxybutyl)-4-nonanolide, 2-(4-hydroxybutyl)-5-decanolide, 5-propyloxy-4-pentanolide, 5-allyloxy-4-pentanolide, 5-(2-hydroxyethoxy)-4-pentanolide, 8-hydroxy-4-octanolide, 6-propyloxy-5-hexanolide, 6-allyloxy-5-hexanolide, 6-(2-hydroxyethoxy)-5-hexanolide, and 9-hydroxy-5-nonanolide), echinomycin, iriflorental, iripallidal, 2'-8-C-glucosyl-7-methylaloesol coumaroyl ester, 2'-8-C-glucosyl-7-methylaloesol cinnamoyl ester, chloropyramine, Pimpinella anisum extract, Aloe arborescens extract, Reynoutria japonica extract, Daphne pseudo-mezereum extract, Cassia obtusifolia extract, Cassiae semen extract, Astragalus mongholicus extract, Astragalus membranaceus extract, Trichosanthes bracteata extract, Xanthium strumarium extract, Gastrodia elata extract, Pyracantha fortuneana extract, Polygonum sachalinense extract, Lindera strychnifolia extract, pumpkin extract, Typha latifolia extract, Euphorbia kansui extract, Agrimonia pilosa var. japonica extract, Lindera umbellata extract, Saxifraga fusca extract, sisal extract, Clematis chinensis extract, Clematis chinensis extract, Clematis chinensis (WEI LING XIAN) extract, Prunus speciosa extract, Prunus sargentii extract, Prunus incisa extract, Prunus nipponica extract, Purunus x subhirtella extract, Prunus lannesiana extract, Aster tataricus extract, Trachycarpus fortunei extract, Iris florentina extract, Clematis terniflora extract, Magnolia salicifolia extract, Saxifraga fortunei var. incislobata extract, Oenothera tetraptera extract, Cuscuta chinensis extract, Cuscuta australis extract, Cuscuta japonica

extract, *Artemisia absinthium* extract, *Achillea alpina* extract, *Dictamnus albus* extract, dill extract, *Fallopia japonica* var. *hachidyoensis* extract, *Tribulus terrestris* extract, *Pyrrosia lingua* extract, *Typha angustifolia* extract, *Angelica dahurica* extract, floral blanca extract, *Buddleja Americana* L. extract, *Artemisia fukudo* extract, *Convolvulus arvensis* extract, sandalwood extract, *Ganoderma lucidum* extract, *Leonurus japonicus* extract, *Salix gilgiana* extract, *Salix chaenomeloides* extract, *Salix gracilistyla* extract, *Salix integra* extract, *Salix kinuyanagi* extract, *Salix koriyanagi* extract, *Salix matsudana* cv. *tortuosa* extract, *Salix reinii* extract, *Salix sieboldiana* extract, *Toisusu urbaniana* extract, *Salix schwernii* extract, *Salix vulpina* extract, *Populus maximowiczii* extract, *Myrica rubra* extract, *Agave americana* extract, American aloe extract, *Edgeworthia chrysantha* extract, *Enteromorpha* (green laver) extract, *Enteromorpha linza* extract, *Enteromorpha prolifera* extract, *Enteromorpha compressa* extract, *Enteromorpha intestinalis* extract, *Enteromorpha crinita* extract, *Laminaria* (sea tangle) extract, *Laminaria japonica* extract, *Laminaria ochotensis* extract, *Laminaria religiosa* extract, *Laminaria angustata* extract, *Undaria pinnatifida* extract, *Undaria undaroides* extract, *Undaria peterseniana* extract, *Hizikia fusiformis* extract, *Fucus evanescens* extract, *Padina arborescens* extract, *Padina australis* extract, *kirebanoumiuchiwa* extract, *akabaumiuchiwa* extract, *Padina crassa* extract, *Padina japonica* extract, *Padina minor* extract, *etsukiumiuchiwa* extract, *Eucheuma serra* extract, *Eucheuma amakusaense* extract, *Eucheuma muricatum* extract, *Eucheuma arnoldii* extract, *Chondrus ocellatus* extract,

Chondrus verrucosus extract, Chondrus nipponicus extract,  
Chondrus pinnulatus extract, Chondracanthus tenellus extract,  
Chondracanthus teedii extract, Chondracanthus intermedius  
extract, Dictyopteris latiuscula extract, uraboshiyahazu extract,  
Padina arborescens extract, Sphaerotrichia divaricata extract,  
Cymathaere japonica extract, Cymathaere japonica Miyabe et Nagai  
extract, Sargassum hemiphyllum extract, Sargassum segii extract,  
Sargassum filicinum extract, Sargassum sagamianum extract,  
Sargassum nigrifolium extract, Sargassum piluliferum extract,  
Sargassum tosaense extract, Sargassum patens extract, Sargassum  
thunbergii extract, Sargassum ringgoldianum extract, Sargassum  
confusum extract, Sargassum kjellmanianum extract, Sargassum  
siliquastrum extract, Sargassum macrocarpum extract, Sargassum  
giganteifolium extract, Grateloupia filicina extract, Halymenia  
agardhii extract, kuronurakusa extract, Halymenia acuminata  
extract, Carpopeltis affinis extract, Gracilaria gigas extract,  
Ceratodictyon spongiosum extract, Lomentaria catenata extract,  
himefushitsunagi extract, Lomentaria pinnata extract, Laurencia  
intermedia extract, Laurencia undulata extract, Laurencia  
pinnata extract, Laurencia brongniartii extract, Odonthalia  
corymbifera extract, Tila extract, Camotede azafran extract,  
Hamaika extract, Poleo verde extract, Navo negro extract, and so  
on.

[0049]

(14) Melanin production inhibitor

Salicylic acid or salts thereof and their derivatives (such  
as salicylic acid glucoside, salicylic acid fatty acid ester,  
salicylic acid alcohol ether, and salicylic acid amides),

salicyl alcohol or salts thereof and their derivatives, apigenin, amentoflavone, Zanthoxylum piperitum extract, Aralia cordata extract, Angelica pubescens extract, Anemone flaccida extract, kashi extract, Circaea cordata extract, Ageratum conyzoides L. extract, Rumex japonicus extract, Gymnema sylvesta extract, Lysimachia christinae extract, gyokuyoukinka extract, Mussaenda parviflora extract, Polygonum cognatum extract, Jasminum officinalis extract, Alcea rosea extract, Athaea officinalis extract, Arabidopsis thaliana extract, Convallaria keiskei extract, Aconitum pseudolaeve extract, Erythrina variegata extract, Eucommia ulmoides extract, Ruscus aculeatus (Butcher's bloom) extract, Ecballium elaterium extract, Loropetalum chinense extract, Sapium sebiferum extract, Ailanthus altissima extract, Dianthus extract, Polygonum aviculare extract, Polygonum aviculare L. extract, Corchorus olitorius extract, Salix subfragilis extract, Salix babylonica extract, Magnolia liliflora extract, Kummerowia striata extract, tamazakifujime extract, Wikstroemia indica extract, Dictyota dichotoma extract, and shell extracts (such as cockle extract, Perna viridis extract, European oyster extract, Patinopecten yessoensis extract, Ruditapes philippinarum extract, Meretrix extract, Mactra chinensis extract, Nuttallia japonica extract, Anadara broughtoni extract, Haliotis extract, Turbo cornutus extract, Babylonia japonica extract, and so on), and so on.

[0050]

(15) Humectant

Polyols such as ethylene oxide, ethylene glycol, diethylene glycol, triethylene glycol, ethylene glycol monoethyl ether,

ethylene glycol monobutyl ether, diethylene glycol monomethyl ether, diethylene glycol monoethyl ether, polyethylene glycol, propylene oxide, propylene glycol, polypropylene glycol, 1,3-butylene glycol, pentyl glycol, glycerin, erythritol, pentaerythritol, dipentaerythritol, threitol, arabitol, xylitol, ribitol, galactitol, sorbitol, mannitol, lactitol, maltitol, sitiritol, laminitol, valienamine, validamine, and validatol, gum arabic, benzoin gum, dammar gum, guaiacum, Irish moss, karaya gum, tragacanth gum, carob gum, quince seed, agar, casein, sugars such as glucose, galactose, mannose, xylose, fructose, maltose, isomaltose, cellobiose, gentiobiose, trehalose, kojibiose, laminaribiose, nigerose, cellobiose, sanbubiose, neohesperidose, apiose, hamamelose, streptose, hydroxystreptose, dihydrostreptose, 2-methylerythrose or derivatives thereof, 2-methylerythronolactone, mycarose, cladinose, axenose, arcanose, olivomucose, chromose, evamicose, vinelose, nogalose, virenose, noviose, moenuronic acid, garosamine, sibirosamine, N-acylkansosamine, vancosamine, evanitrose, rubranitrose, tetronitrose, pyralose,  $\alpha$ -octose, trioxacarcinose, aldogalose, and blastminocin or esters thereof, trehalose or derivatives thereof, D-mannosamine and derivatives thereof, primeverose or derivatives thereof, dextrin, gelatin, pectin, starch, carrageenan, carboxymethyl chitin or chitosan, hydroxyalkyl (C2 to C4) chitin or chitosan with the addition of alkylene (C2 to C4) oxide such as ethylene oxide, low molecular weight chitin or chitosan, chitosan salts, sulfated chitin or chitosan, phosphorylated chitin or chitosan, alginic acid or salts thereof, hyaluronic acid or salts thereof, chondroitin sulfuric acid or

salts thereof, heparin, ethyl cellulose, methyl cellulose, carboxymethyl cellulose, carboxyethyl cellulose, sodium carboxyethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, nitrocellulose, crystalline cellulose, hydroxypropylmethyl cellulose, water-soluble polymers such as dermatan sulfate and keratan sulfate, glycerin fatty acid pyrrolidone carboxylic acid esters, glycerin fatty acid acetyl amino acid esters, pyrrolidone carboxylic acid or salts thereof, polyaspartic acid or salts thereof, polyglutamic acid or salts thereof, polylysine or salts thereof, sodium lactate, hidantoin and derivatives thereof, N-p-vinylbenzyl-D-cellobionamide, N-p-vinylbenzyl-D-lactoneamide, N-p-vinylbenzyl-D-maltonamide, N-p-vinylbenzyl-D-gluconamide, glucosyloxyethyl methacrylate, galactosyloxypropyl acrylate, mannosyloxyethyl methacrylate, glutamyl lysine, glutaurine, 1,2,4-butanetriol, carane-3,4-diol, azukisaponin (such as 3-o- $[\beta$ -D-glucopyranosyl- $\beta$ -D-glucuronopyranosyl]-sophoradiol, 3-o- $[\beta$ -D-glucopyranosyl-3-D-glucuronopyranosyl]-soyasapongenol B, 3-o- $[\beta$ -D-glucopyranosyl- $\beta$ -D-glucuronopyranosyl]-azukisapogenol, 3-o- $[\beta$ -D-glucopyranosyl]-28-o- $[\beta$ -D-glucopyranosyl- $\beta$ -D-glucopyranosyl]-gypsogenic acid, 3-o- $[\alpha$ -L-rhamnopyranosyl- $\beta$ -D-glucopyranosyl- $\beta$ -D-glucuronopyranosyl]-soyasapogenol B, and 3-o- $[\beta$ -D-glucopyranosyl- $\beta$ -D-glucuronopyranosyl]-29-o- $[\beta$ -D-glucopyranosyl- $\beta$ -D-glucopyranosyl]-azukisapogenol), Aucuba japonica extract, Firmiana simplex extract, Firmiana platanifolia extract, Astilbe thunbergii extract, Trifolium pratense extract, Thalictrum minus var. hypoleucum extract, Aguaje extract, Ipomoea purpurea extract, Ipomoea extract, Achira extract, Brassica rapa var.

amplexicaulis extract, Gynostemma pentaphyllum extract, Amana  
edulis extract, Amaranthus extract, Amaranthus tricolor extract,  
Amaranthus caudatus extract, Amaranthus caudatus extract,  
Amaranthus cruentus extract, Amaranthus patulus extract,  
Amaranthus retroflexus L. extract, Amaranthus spinosus extract,  
Epipactis papillosa extract, Amaranthus hypochondriacus extract,  
Alstroemeria spp. extract, Alkanna extract, algarrobo extract,  
aloe vera extract, Juncus effusus var. decipiens extract, Taxus  
cuspidata extract, strawberry extract, Ceratonia siliqua extract,  
Draba nemorosaextract, rice extract, Nepeta catria extract,  
Conandron ramondioides extract, Selaginella tamariscina extract,  
Selaginella tamariscina Spring extract, Jenipapo extract,  
Spirodela polyrhiza extract, Althaea officinalis L. extract,  
Malva sylvestris extract, Una de Gato extract, Flammulina  
velutipes extract, Pleurotus eryngii extract, Pleurotus eryngii  
extract, Opuntia maxima extract, Inula helenium extract,  
Eriocaulon buergerianum extract, oka extract, Cnidium monnieri  
extract, Abelmoschus esculentus extract, Dioscorea tokoro  
extract, Dioscorea extract, Dioscorea hypoglauca extract, Ononis  
spinosa extract, ulluco extract, Glechoma hederacea extract,  
Glechoma hederacea var. grandis extract, Hydrangea macrophylla  
extract, Rhamnus purshiana extract, Gypsophila elegans extract,  
Panax ginseng extract, kaniwa extract, Dianthus caryophyllus  
extract, Gerbera hybrids extract, Camu Camu extract,  
Zantedeschia spp. extract, Avena sativa extract, Chaenomeles  
sinensis extract, Potentilla chinensis extract, Veronica  
undulata extract, Dianthus superbus var. longicalycinus extract,  
Dianthus superbus var. superbus extract, Agave cantala extract,



*Chrysanthemum boreale* extract, *Chenopodium quinoa* willdenow  
 extract, *Brassica oleracea* extract, *Actinidia chinensis* extract,  
*Cucumis Sativus* extract, *Tamarix chinensis* extract, *Ajuga*  
*decumbens* extract, *Parthenium argentatum* extract, *Asparagus*  
*cochinchinensis* extract, *Artemisia annua* extract, *Theobroma*  
*grandiflorum* extract, *Thlaspi arvense* extract, *Hovenia dulcis*  
 extract, *Epiphyllum oxypetalum* extract, *Picrorhiza kurroo*  
 extract, *Cocos nucifera* extract, *Cosmos bipinnatus* extract,  
*Clematis apiifolia* var. *bitermata* extract, rice oil extract,  
*Amorphophallus rivieri* var. *konjac* extract, *Crocus sativus*  
 extract, *Achras zapota* extract, *Sangre de grado* extract, *Panax*  
*notoginseng* extract, *Shea* extract, *Butyrospermum parkii* extract,  
*Lentinula edodes* extract, *Lyophyllum* extract, *hinshimeji* extract,  
*Lyophyllum fumosum* extract, *Lyophyllum decastes* extract,  
*Lyophyllum connatum* extract, *Hypsizygus marmoreus* extract,  
*Lyophyllum shimeji* extract, *Hypsizygus ulmarium* extract,  
*Magnolia liliflora* extract, *Asarum* extract, *cactus* extract,  
*Ophiopogon japonicus* extract, *Gypsophila paniculata* extract,  
*Dichroa febrifuga* extract, *Sesbania grandiflora* extract, *Abrus*  
*precatorius* extract, *Daphne odora* extract, *Citrullus lanatus*  
 extract, *Vincetoxicum pycnostelma* extract, *Portulaca oleracea*  
 extract, *Dendrobium moniliforme* extract, *Dendrobium linawianum*  
 extract, *Dendrobium nobile* extract, *oobana sekkoku* extract,  
*Dendrobium okinawense* extract, *Dendrobium officinale* extract,  
*Dendrobium phalaenopsis* extract, *shikaku sekkoku* extract,  
*Dendrobium tosaense* extract, *cedron* extract, *Malva sylvestris*  
 extract, *celery* extract, *Andrographis paniculata* extract,  
 Oriental radish extract, *Eclipta prostrata* extract, *Dioscorea*

gracillima extract, Dahlia pinnata extract, Tarwi extract, Euphorbia lathyris extract, Atractylodis lanceae extract, Chanca piedra extract, Tulip extract, Chinese artichoke extract, Agaricus bisporus extract, Camellia japonica extract, Sagina japonica extract, Dipsacus asper extract, corn extract, corn silk extract, Equisetum hyemale extract, Fraxinus japonica extract, Eustoma grandiflorum extract, Canavalia gladiata extract, Canavalia gladiata extract, Zizyphus jujuba extract, Dipsacus japonicus extract, Pholiota nameko extract, Boehmeria nivea extract, Myristica fragrans extract, Albizia julibrissin Durazz extract, Albizia julibrissin Durazz extract, Albizia julibrissin Durazz extract, Albizia julibrissin Durazz extract, Lycoris radiata extract, Celosia argentea extract, Gentiana decumbens extract, Acer japonicum extract, Lupinus perennis extract, Carica papaya extract, Pajaro Bobo extract, Balata rubber extract, Agariccus campestris extract, Agariccus campestris extract, Agaricus arvensis extract, Agaricus abruptibulbus extract, Aspidistra elatior extract, Pterocarya paliurus extract, Balsamina extract, Gentiana thunbergii extract, Sterculia lychnophora extract, Dahlia coccinea extract, Beta vulgaris extract, Taujopsis dolabrata extract, Helianthus annuus extract, Capsicum annuum var. grossum extract, Semiaquilegia adoxoides extract, Agaricus blazei Murrill extract, Cordyceps sinensis extract, Periandra mediterranea extract, Corylus avellana extract, sponge gourd extract, Crassulaceae extract, Sedum alboroseum extract, Kochia scoparia extract, Belvedere extract, Kochia scoparia extract, Bassia scoparia extract, Stellaria dichotoma extract, Sedum aizoon extract, jojoba

extract, borage extract, bordeaux extract, Cistanche salsa  
extract, Dendrobium officinale extract, Lepidium meyenii extract,  
macadamia nut extract, marguerite extract, Tropaeolum tuberosum  
Ruiz et Pav. extract, Tropaeolum tuberosum extract, Actinidia  
polygama extract, pine cone extract, Poria cocos extract,  
Buddleja globosa extract, Cydonia oblonga extract, Verbascum  
thapsus extract, Andes camomile extract, Ottelia japonica  
extract, Ottelia alismoides extract, Mentha arvensis extract,  
Helichrysum bracteatum extract, munya extract, Callicarpa  
japonica extract, Millettia reticulata extract, Shinus molle  
extract, Ilex integra extract, Rodgersia podophylla extract,  
yacon extract, palm tree extract, Carpesium abrotanoides extract,  
Horse chesnut extract, Chaenomeles lagenaria extract, lily  
extract, Polyporus mylittae extract, Citrus aurantifolia extract,  
rye extract, shallot extract, eschalot extract, apple extract,  
Gentiana scabra extract, Litchi chinensis extract, Astragalus  
sinicus extract, Coix lachrma jobi extract, minisasanishiki  
extract, Chlorella vulgaris extract, Chlorella pyrenoidsa  
extract, Chlorella elypsoidia extract, Macrocystis pyrifera  
extract, Acanthopeltis japonica extract, Meristotheca papulosa  
extract, Gelidium japonicum extract, Porphyra extract, Spirogyra  
extract, Prasiola japonica extract, Aegagropila Linnaei extract,  
Kornmannia leptoderma extract, Dictyopteris divaricata extract,  
Petalonia binghamiae extract, Petalonia fascia extract,  
Colpomenia bullosa extract, Agarum clathratum extract, Costaria  
costata extract, Kjellmaniella gyrate extract, Eckloniopsis  
radicosa extract, Ecklonia stolonifera extract, Hedophyllum  
extract, Arthrothamnus bifidus extract, Alaria praelonga extract,

*Alaria crassifolia* extract, *Silvetia babingtonii* extract,  
*Cystoseira prolifera* extract, *Turbinaria ornata* extract,  
*Cystoseira hakodatensis* extract, *Myagropsis myagroides* extract,  
*Myagropsis yendoi* extract, *Sargassum nipponicum* extract,  
*Sargassum fulvellum* extract, *Coccophora langsdorfii* extract,  
*Bangia atropurpurea* extract, *Porphyra yezoensis* extract,  
*Trichogloea hequieni* extract, *Nemalion vermiculare* extract,  
*Scinaia japonica* extract, *Portieria hornemanni* extract,  
*Gloiopeltis complanata* extract, *Gloiosiphonia capillaris* extract,  
*Bonnemaisonia hamifera* extract, *Solieria pacifica* extract,  
*Solieria tenuis* extract, *Meristotheca coacta* Okamura extract,  
*Turnerella mertensiana* extract, *Hypnea charoides* extract, *Hypnea*  
*japonica* extract, *Hypnea saidana* extract, *Hypnea variabilis*  
extract, *Gracilaria vermiculophylla* extract, *Gracilaria chorda*  
extract, *Gelidiopsis hachijoensis* extract, *Ahnfeltiopsis*  
*flabelliformis* extract, *Mazzaella japonica* extract, metabolites  
of *Bacillus subtilis* var. natto, Natto extract, loofah lotion,  
sap from *Betula platyphylla* or *Pinus densiflora*, and so on.  
[0051]

(16) Cell activating agent/metabolism promoting agent

Vitamin A group: retinol or salts thereof and their  
derivatives (retinol unsaturated fatty acid ester such as  
retinyl linoleate, retinyl linolenate, retinyl oleate, and  
retinyl arachidonate), retinal or salts thereof and their  
derivatives; dehydroretinal or salts thereof and their  
derivatives, retinoic acid or salts thereof and their  
derivatives, retinoic acid analogues (4-[[[8-(3,5-  
dimethylphenyl)-2-naphthalenyl]carbonyl]amino]benzoic acid, 4-

[[[8-(3-methylphenyl)-2-naphthalenyl]carbonyl]amino]benzoic acid,  
 4-[[[8-(4-methylphenyl)-2-naphthalenyl]carbonyl]amino]benzoic  
 acid, 4-[[[8-(2-methylphenyl)-2-  
 naphthalenyl]carbonyl]amino]benzoic acid, 4-[[[8-(3,4-  
 dimethylphenyl)-2-naphthalenyl]carbonyl]amino]benzoic acid, 4-  
 [[[8-(2,4-dimethylphenyl)-2-naphthalenyl]carbonyl]amino]benzoic  
 acid, 4-[[[8-(2-isopropylphenyl)-2-  
 naphthalenyl]carbonyl]amino]benzoic acid, 4-[[[8-(2-  
 ethylphenyl)-2-naphthalenyl]carbonyl]amino]benzoic acid, 4-[[[8-  
 (2-fluorophenyl)-2-naphthalenyl]carbonyl]amino]benzoic acid, 4-  
 [[[8-(2-methoxyphenyl)-2-naphthalenyl]carbonyl]amino]benzoic  
 acid, 4-[[[8-(benzyl-2-naphthalenyl)carbonyl]amino]benzoic acid,  
 and 4-[(E)-2-(8-phenyl-2-naphthalenyl)propenyl]benzoic acid), a  
 retinoic acid derivative (4-hydroxyphenylretinamide), retinoid  
 analogues (4-[[[(5,6-dihydro-5,5-dimethyl-8-ethyl-2-  
 naphthalenyl)amino]carbonyl]benzoic acid, 4-[[[(5,6-dihydro-  
 5,5,8-trimethyl-2-naphthalenyl)amino]carbonyl]benzoic acid, 4-  
 [[[(5,6-dihydro-5,5-dimethyl-8-phenyl-2-  
 naphthalenyl)amino]carbonyl]benzoic acid, 4-[[[(5,6-dihydro-5,5-  
 dimethyl-8-ethyl-2-naphthalenyl)carbonyl]amino]benzoic acid, 4-  
 [[[(5,6-dihydro-5,5,8-trimethyl-2-naphthalenyl)-  
 carbonyl]amino]benzoic acid, 4-(E)-[2-(5,6-dihydro-5,5-dimethyl-  
 8-phenyl-2-naphthalenyl)-1-propenyl]benzoic acid, 4-[[[(5,6-  
 dihydro-5,5-dimethyl-8-phenyl-2-  
 naphthalenyl)oxy]carbonyl]benzoic acid, 4-[[[(5,6-dihydro-5,5-  
 dimethyl-8-phenyl-2-(naphthalenyl)carbonyl]amino]benzoic acid,  
 4-[[[(5,6-dihydro-5,5-dimethyl-8-phenyl-2-  
 (naphthalenyl)carbonyl]oxy]benzoic acid, 4-[[5,6-dihydro-5,5-

dimethyl-8-(2-fluorophenyl)-naphthalenyl]carbonyl]amino]benzoic  
 acid, 4-[[[(5,6-dihydro-5,5,6-trimethyl]-8-phenyl-2-  
 (naphthalenyl)carbonyl]amino]benzoic acid, 4-[[[(5,6-dihydro-  
 5,5,7-trimethyl-8-phenyl-2-naphthalenyl)carbonyl]benzoic acid,  
 4-[[[(E)-(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-  
 naphthalenyl]vinyl]benzoic acid, 4-[[[(5,6-dihydro-5,5-dimethyl-  
 8-phenyl)-2-naphthalenyl]carbonyl]sulfamyl]benzoic acid, 4-  
 [[[(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-  
 naphthalenyl]sulfamyl]carbonyl]benzoic acid, 4-[[[(5,6-dihydro-  
 5,5-dimethyl-8-phenyl)-2-naphthalenyl]ethyl]benzoic acid, 4-  
 [[[(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-  
 naphthalenyl]thiocarbonyl]amino]benzoic acid, 4-[[[(5,6-dihydro-  
 5,5-dimethyl-8-phenyl)-2-naphthalenyl]carbonyl]methyl]benzoic  
 acid, 4-[[[(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-  
 naphthalenyl]methyl]oxy]benzoic acid, 4-[[[(5,6-dihydro-5,5-  
 dimethyl-8-phenyl)-2-naphthalenyl]oxy]methyl]benzoic acid, 4-  
 [[[(5,6-dihydro-5,5-dimethyl-8-(2,4-dimethylphenyl))-2-  
 naphthalenyl]carbonyl]amino]benzoic acid, 4-[[[(5,6-dihydro-5,5-  
 dimethyl-8-(4-methylphenyl))-2-  
 naphthalenyl]carbonyl]amino]benzoic acid, 4-[[[(5,6-dihydro-5,5-  
 dimethyl-8-phenyl)-2-naphthalenyl]ethyl]benzoic acid, 4-[[[(5,6-  
 dihydro-5,5-dimethyl-8-phenyl)-2-  
 naphthalenyl]sulfamyl]methyl]benzoic acid, 4-[[[(5,6-dihydro-5,5-  
 dimethyl-8-phenyl)-2-naphthalenyl]methyl]amino]benzoic acid, 4-  
 [[[(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-  
 naphthalenyl]amino]thiocarbonyl]benzoic acid, 4-[[[(5,6-dihydro-  
 5,5-dimethyl-8-phenyl)-2-naphthalenyl]methyl]sulfamyl]benzoic  
 acid, 4-[[[(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-

naphthalenyl)amino]methyl]benzoic acid, 4-[[[(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-naphthalenyl]carbonyl]amino]-2-hydroxybenzoic acid, 4-[[[(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-naphthalenyl]carbonyl]amino]-2-nitrobenzoic acid, 4-[[[(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-naphthalenyl]carbonyl]amino]-2-fluorobenzoic acid, 4-[[[(5,6-dihydro-5,5-dimethyl-8-phenyl)-2-naphthalenyl]carbonyl]amino]-2-methoxybenzoic acid, 4-[[[(5,6-dihydro-5,5-dimethyl-8-(2-naphthalene))-2-naphthalenyl]carbonyl]amino]benzoic acid, 4-[[[(5,6-dihydro-8-phenyl-2-naphthalenyl)carbonyl]aminobenzoic acid, 4-[[[(5,6-dihydro-5,5-dimethyl-8-phenyl-2-naphthalenyl)carbonyl]amino]-3-fluorobenzoic acid, 4-[[[(5,6-dihydro-5,5-dimethyl-8-phenyl-2-naphthalenyl)carbonyl]amino]-3-methylbenzoic acid, 4-[[[(5,8,10,10a-tetrahydro-10,10-dimethyl-9-phenyl-2-anthracenyl)carbonyl]amino]benzoic acid, 4-[[[(1,1-dimethyl-3-phenyl-1H-inden-5-yl)amino]carbonyl]benzoic acid, 4-[(1,1-dimethyl-3-phenyl-1H-inden-5-yl-oxymethyl)benzoic acid, 4-[2-(1,1-dimethyl-3-phenyl-1H-inden-5-yl)vinyl]benzoic acid, and 4-[[[(1,1-dimethyl-3-phenyl-1H-indene-5-carbonyl)amino]benzoic acid), carotene or salts thereof and their derivatives (carotenoids such as  $\alpha$ -carotene,  $\beta$ -carotene,  $\gamma$ -carotene, lycopene, cryptoxanthin, lutein, zeaxanthin, isozeaxanthin, rhodoxanthin, capsanthin, and crocetin), and lycopene or salts thereof and their derivatives; vitamin B group: thiamine or salts thereof and their derivatives (such as thiamine hydrochloride, thiamine disulfide, bisbenthiamine, bisibuthiamine, thiamine monophosphate disulfide, benfothiamine, cycotiamine, octothiamine, dicethiamine, fursulthiamine, prosulthiamine, and

astaxanthin thiamine phosphoric acid diester), thiamine sulfate, riboflavin or salts thereof and their derivatives (such as flavin adenine dinucleotide, flavin mononucleotide, riboflavin phosphoric acid diester, 1- $\beta$ -D-riboflanosyl nicotinamide pyrophosphoric acid diester, and 1- $\beta$ -D-riboflanosyl nicotinate), pyridoxine or salts thereof and their derivatives (such as pyridoxine 3,4-dipalmitate, pyridoxine 3,4-dicaprylic acid, and pyridoxine sulfuric acid diester), pyridoxal or salts thereof and their derivatives, pyridoxamine or salts thereof and their derivatives, cyanocobalamin or salts thereof and their derivatives, cobalamins (such as methylcobalamin, adenosylcobalamin, hydroxocobalamin, and aquacobalamin), folic acid or salts thereof and their derivatives, nicotinic acid or salts thereof and their derivatives, pantothenic acid or salts thereof and their derivatives, biotin or salts thereof and their derivatives, choline or salts thereof and their derivatives, and inositol or salts thereof and their derivatives; vitamin C group: ascorbic acid or salts thereof and their derivatives; vitamin D group: ergocalciferol or salts thereof and their derivatives, cholecalciferol or salts thereof and their derivatives (such as 1 $\alpha$ -hydroxy-22-[(1-hydroxy-1-methyl)-2-cyclopenten-4-yl-oxy]-23,24,25,26,27-pentanolcholecalciferol, [1R,4R]-1 $\alpha$ -hydroxy-22-[(1-hydroxy-1-methyl)-2-cyclopenten-4-yl-oxy]-23,24,25,26,27-pentanolcholecalciferol, [1R,4S]-1 $\alpha$ -hydroxy-22-[(1-hydroxy-1-methyl)-2-cyclopenten-4-yl-oxy]-23,24,25,26,27-pentanolcholecalciferol, [1S,4R]-1 $\alpha$ -hydroxy-22-[(1-hydroxy-1-methyl)-2-cyclopenten-4-yl-oxy]-23,24,25,26,27-pentanolcholecalciferol, and [1S,4S]-1 $\alpha$ -hydroxy-22-[(1-hydroxy-



1-methyl)-2-cyclopenten-4-yl-oxy]-23,24,25,26,27-pentanolcholecalciferol), and dihydrotachysterol or salts thereof and their derivatives; vitamin E group: tocopherol or salts thereof and their derivatives, tocotrienol or salts thereof and their derivatives, and ubiquinone or salts thereof and their derivatives; vitamin K group: phytonadione or salts thereof and their derivatives, menaquinone or salts thereof and their derivatives, menadione or salts thereof and their derivatives, and menadiol or salts thereof and their derivatives; vitamin F group: linoleic acid or salts thereof and their derivatives, linolenic acid or salts thereof and their derivatives, arachidonic acid or salts thereof and their derivatives, carnitine or salts thereof and their derivatives, ferulic acid or salts thereof and their derivatives,  $\gamma$ -olizanol or salts thereof and their derivatives, and orotic acid or salts thereof and their derivatives; vitamin P group: eryocitrin or salts thereof and their derivatives; vitamin L group: anthranilic acid or salts thereof and their derivatives, and adenylothiomethylpentose or salts thereof and their derivatives; vitamin U group: methylmethionine sulfonium chloride and derivatives thereof, valine, leucine, isoleucine, threonine, methionine, phenylalanine, tryptophan, lysine, glycine, alanine, asparagine, glutamine, serine, cysteine, cystine, tyrosine, proline, hydroxyproline, aspartic acid, glutamic acid, hydroxylysine, arginine, ornithine, and histidine and derivatives thereof (such as N-octyloxycarbonyl- $\beta$ -alanyl-L-histidine, N-dodecyloxycarbonyl- $\beta$ -alanyl-L-histidine, N-(12-amino-1-oxododecyl)-L-histidine, N-2-ethylhexyloxycarbonyl- $\beta$ -

alanyl-L-histidine hydrochloride, N-hexadecyloxycarbonyl- $\beta$ -  
 alanyl-L-histidine, N-octylaminocarbonyl- $\beta$ -alanyl-L-histidine, N-  
 dodecylaminocarbonyl- $\beta$ -alanyl-L-histidine, and N-dodecylsulfonyl-  
 $\beta$ -alanyl-L-histidine, N-dodecylamino-oxalyl- $\beta$ -alanyl-L-histidine)  
 and sulfates, phosphates, nitrates, and citrates thereof, amino  
 acids such as amino acid derivatives (such as pyrrolidone  
 carboxylate),  $\alpha$ -hydroxy acids such as glycolic acid, citric acid,  
 malic acid, tartaric acid, lactic acid, and succinic acid, 2-  
 hydroxycarboxylic acids (such as methyllactic acid, 2-  
 hydroxybutanoic acid, 2-hydroxypentanoic acid, 2-hydroxyhexanoic  
 acid, 2-hydroxyheptanoic acid, 2-hydroxyoctanoic acid, 2-  
 hydroxynonanoic acid, 2-hydroxydecanoic acid, 2-  
 hydroxyundecanoic acid,  $\alpha$ -hydroxylauric acid,  $\alpha$ -hydroxymyristic  
 acid,  $\alpha$ -hydroxypalmitic acid,  $\alpha$ -hydroxystearic acid,  $\alpha$ -  
 hydroxyarachidonic acid, cerebronic acid,  $\alpha$ -hydroxynervonic acid,  
 mandelic acid, benzilic acid, phenyllactic acid, atrolactic acid,  
 2-(4'-hydroxyphenyl)-2-hydroxyethanoic acid, 2-(4'-  
 chlorophenyl)-2-hydroxyethanoic acid, 2-(3'-hydroxy-4'-  
 methoxyphenyl)-2-hydroxyethanoic acid, 2-(4'-hydroxy-3'-  
 methoxyphenyl)-2-hydroxyethanoic acid, 3-(2'-hydroxyphenyl)-2-  
 hydroxypropanoic acid, 3-(4'-hydroxyphenyl)-2-hydroxypropanoic  
 acid, 2-(3',4'-dihydroxyphenyl)-2-hydroxyethanoic acid, glyceric  
 acid, erythronic acid, ribonic acid, arabinonic acid, xylonic  
 acid, lyxonic acid, allonic acid, altronic acid, gluconic acid,  
 mannonic acid, gulonic acid, idonic acid, galactonic acid,  
 talonic acid, glucoheptonic acid, galactoheptonic acid,  
 tartronic acid, and mucic acid), polyhydroxycarboxylic acid and  
 hydroxypolycarboxylic acid (such as gluconolactone,

galactonolactone, glucuronolactone, galacturonolactone, glonolactone, ribonolactone, saccharic acid lactone, pantoyllactone, glucoheptonolactone, mannolactone, and galactoheptonolactone), 2-keto acids (such as glyoxalic acid, methyl 2-ketoethanoate, benzoylformic acid, methyl benzoylformate, ethyl benzoylformate, phenylpyruvic acid, methyl phenylpyruvate, ethyl phenylpyruvate, 2-ketobutanoic acid, 2-ketopentanoic acid, 2-ketohexanoic acid, 2-ketoheptanoic acid, 2-ketooctanoic acid, 2-ketododecanoic acid, and 2-methyl ketooctanoate), quinic acid, isocitric acid, tropic acid, trethocanic acid, 3-chlorolactic acid, cerebronic acid, citramalic acid, agaricic acid, alloy ricinic acid, pantoic acid, lactobionic acid, hexuronic acid, photosensitive element 301, hinokithiol, pantothenic acid and derivatives thereof, allantoin, glyceride pentadecanoate, linolenic acid and derivatives thereof, eicosapentaenoic acid and derivatives thereof, docosahexaenoic acid and derivatives thereof, estradiol, ethenylestradiol, antiarol and glycosides thereof, lyoni-resinol and glycosides thereof, rhododendrol and glycosides thereof, platiphyllonol and glycosides thereof, lactone compounds (D-glucurono-6,3-lactone,  $\alpha$ -D-glucoheptonic- $\gamma$ -lactone,  $\delta$ -glucuronolactone,  $\alpha,\beta$ -glucooctonic- $\gamma$ -lactone, L-glonic- $\gamma$ -lactone,  $\gamma$ -D-galactonolactone, D-saccharic-1,4-lactone, D-saccharic-3,6-lactone, D-ribonic- $\gamma$ -lactone,  $\alpha$ -butyrolactone,  $\gamma$ -butyrolactone,  $\alpha$ -octanoic lactone,  $\gamma$ -octanoic lactone, nonanoic lactone,  $\gamma$ -valerolactone, D-mannoic- $\delta$ -lactone, D-xyloic- $\delta$ -lactone, D-arabinoic- $\delta$ -lactone, stearyl- $\delta$ -gluconolactone, DL-pantolactone, and palmitoyl-DL-pantolactone), 3-hydroxy-3,4-dicarboxy-1,4-butanolide and derivative thereof;

6-benzylaminopurine and derivatives thereof, 1,4-diazadicyclooctane, 2,5-dimethylfuran, 2-methylfuran, 2,5-diphenylfuran, 1,3-diphenylisobenzofuran, rutin, tectorigenin 7-xylosylglucoside, captopril, alacepril, lisinopril, enalapril, delapril, benazepril, cilazapril, imidapril, quinapril, trandelapril, perindopril, temocapril, losartan, endothelin, galactomannan-saccharide polymers, mucinm, trimethylglycine, proteoglycan, chrysin, apigenin, lutherolin, acacetin, diosmetin, baicalein, kaempferol, quercetin, morin, myricetin, dachiscetin, quercetagetin, rhamnetin, isorhamnetin, gardenin A, gardenin B, gardenin C, gardenin D, gardenin E, pectolinarigenin, eupatrin, fisetin, scutellarein, galangin, homoeriodictyol, pinosembrin, naringenin, hesperetin, eriodictyol, pinobanksin, aromadendrin, taxofolin, ampelopsin, sakuranetin, fuscin, daidzein, formononetin, genistein, prunetin, afromosin, irigenin, glycitin, baptigenin, pratensein, lactobacillus extract, lactobacillus medium extract, lactobacillus-fermented milk extract, bifidobacterium extract, bifidobacterium medium extract, bifidobacterium-fermented milk extract, placenta extract, reishi mushroom extract, spleen extract, thymus extract, yeast extract, yeast medium extract, yeast fermentation extract, fungi extract, fungi medium extract, basidiomycete extract, basidiomycete medium extract, disrupted bacterial cell extract, bacterial medium extract, disrupted cultured human dermal cell extract, Rehmannia glutinosa extract, fennel extract, Eleutherococcus senticosus extract, barley extract, Echinops latifolius extract, Hypericum perforatum extract, Hypericum perforatum extract, parsley extract, celery extract, Rehmannia glutinosa extract,

roman chamonmile extract, Garcinia extract, Artemisia apiacea extract, Epipactis thunbergii extract, Quillaja extract, Cephalanthera falcata extract, Cephalanthera erecta extract, Calendula officinalis extract, Neottia nidusavis extract, Cephalanthera longibracteata extract, Pterocarya rhoifolia extract, Filipendula multijuga extract, Glehnia littoralis extract, Prunus salicina extract, English walnut extract, Equisetum arvense extract, pineapple extract, Orchis aristata extract, Fagus crenata extract, Chinese lantern plant extract, Grifola frondosa extract, Lythrum anceps extract, Hibiscus syriacus extract, Sapindus mukurossi extract, bean sprouts extract, Eucalyptus globulus extract, Rubus suavissimus extract, lettuce extract, aloe extract, Scutellaria baicalensis extract, tonka bean extract, Gentiana extract, burdock extract, Lithospermum erythrorhizone extract, ginseng extract, Hammamelis extract, hops extract, Coix lachryma-jobi extract, Lamium album extract, Swertia japonica extract, Angelica acutiloba extract, Calendula officinalis extract, Hypericum erectum extract, Cucumber extract, thyme extract, rosemary extract, parsley extract, Pachydictyon coriaceum extract, Dilophus okamurae extract, Laminaria coriacea extract, Laminaria religiosa extract, Laminaria diabolica extract, Laminaria yezoensis extract, Laminaria longissima extract, Laminaria yendoana extract, Laminaria cichorioides extract, Galacaura gastigiata extract, Galaxaura falcata extract, Helminthocladia australis extract, Helminthocladia yendoana extract, kagekinori extract, Cirrulicarpus gmelini extract, Gracilaria bursa-pastoris extract, Gracilaria textorii extract, and so on.

[0052]

(17) Antioxidant

Ascorbic acid or salts thereof and their derivatives (such as phosphoric acid-magnesium L-ascorbate, ascorbyl palmitate, ascorbyl dipalmitate, ascorbic acid hydroxyproline phosphoric acid ester, 5-o- $\alpha$ -D-glucopyranosyl-L-ascorbic acid, an L-ascorbyl phosphate sodium salt, an L-ascorbyl phosphate potassium salt, an L-ascorbyl phosphate magnesium salt, an L-ascorbyl phosphate calcium salt, an L-ascorbyl phosphate aluminum salt, an L-ascorbyl sulfate sodium salt, an L-ascorbyl sulfate potassium salt, an L-ascorbyl sulfate magnesium salt, an L-ascorbyl sulfate calcium salt, an L-ascorbyl sulfate aluminum salt, sodium L-ascorbate, potassium L-ascorbate, magnesium L-ascorbate, calcium L-ascorbate, aluminum L-ascorbate, 6-o- $\alpha$ -D-galactopyranosyl-L-ascorbic acid, 2-o- $\beta$ -D-galactopyranosyl-L-ascorbic acid, an L-ascorbyl phosphate magnesium salt, an L-ascorbyl phosphate sodium salt, an L-ascorbyl sulfate sodium salt, a 6-o-acylascorbyl phosphate sodium salt, a 6-o-acylascorbyl phosphate ammonium salt, a 6-o-acylascorbyl phosphate isopropanolamine salt, 3-o-isopropyl-L-ascorbic acid, a 6-o-alkylascorbyl phosphate potassium salt, a 6-o-alkylascorbyl phosphate calcium salt, a 6-o-alkylascorbyl phosphate barium salt, a 6-o-alkylascorbyl phosphate ammonium salt, a 6-o-alkylascorbyl phosphate monoethanolamine salt, a 6-o-alkylascorbyl phosphate diethanolamine salt, a 6-o-alkylascorbyl phosphate triethanolamine salt, a 6-o-alkylascorbyl phosphate monoisopropanolamine salt, a 6-o-alkylascorbyl phosphate diisopropanolamine salt, a 6-o-

alkylascorbyl phosphate triisopropanolamine salt, 3-o-glycosyl-L-ascorbic acid, 6-o- $\beta$ -D-galactopyranosyl-L-ascorbic acid, ascorbic acid phosphoric acid cholesterol ester, L-ascorbyl palmitate, L-ascorbyl isopalmitate, L-ascorbyl dipalmitate, L-ascorbyl diisopalmitate, L-ascorbyl stearate, L-ascorbyl isostearate, L-ascorbyl distearate, L-ascorbyl diisostearate, L-ascorbyl myristate, L-ascorbyl isomyristate, L-ascorbyl dimyristate, L-ascorbyl diisomyristate, L-ascorbyl 2-ethylhexanoate, L-ascorbyl di-2-ethylhexanoate, L-ascorbyl-oleate, 2-o- $\alpha$ -D-glucosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltotriosyl-L-ascorbic acid, 3-o- $\alpha$ -D-glucosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltosyl-L-ascorbic acid, 2-o- $\alpha$ -D-maltotriosyl-L-ascorbic acid, L-ascorbic acid tetraisopalmitic acid ester, L-ascorbic acid tetralauric acid ester, L-ascorbic acid tetra-2-ethylhexanoic acid ester, L-ascorbic acid tetraoleic acid ester, 5,6-isopropylidene-L-ascorbic acid, retinol L-ascorbate, L-ascorbic acid-DL-tocopherol phosphoric acid ester, L-3-o-ethylascorbic acid, L-ascorbic acid tristearate, L-ascorbic acid tripalmitate, L-ascorbic acid trioleate, L-ascorbic acid triphosphoric acid ester, 2-o-ascorbyl cinnamate, 2-o-ascorbyl ferulate, 2-o-ascorbyl caffeate, 2-O-ascorbyl cinnapate, 2-o-[6-palmitoylascorbyl]-4'-acetoxyferulate, DL- $\alpha$ -tocopherol-2-L-ascorbic acid phosphoric acid diester, ascorbic acid inositol conjugate derivatives, phosphoamide ascorbate derivatives, ascorbic acid arbutin conjugates, ascorbyl phosphoryl cholesterol, chromanil ascorbic acid derivatives, and ascorbyl sialate derivatives), stearic acid ester, tocopherol or salts

thereof and their derivatives (such as  $\alpha$ -tocopherol,  $\beta$ -tocopherol,  $\gamma$ -tocopherol,  $\delta$ -tocopherol,  $\epsilon$ -tocopherol,  $\alpha$ -tocopherylretinoate, aminomethylated tocopherol, hydroxymethylated tocopherol, tocopheryl phosphate, tocopherol acetate, tocopherol nicotinate, tocopherol succinate, tocopherol linoleate, tocopherol orotate, DL- $\alpha$ -tocopherylglucoside, DL- $\alpha$ -tocopherylmaltoside, DL- $\beta$ -tocopherylglucoside, DL- $\beta$ -tocopherylmaltoside, DL- $\gamma$ -tocopherylglucoside, DL- $\gamma$ -tocopherylmaltoside, DL- $\delta$ -tocopherylglucoside, DL- $\delta$ -tocopherylmaltoside, D- $\alpha$ -tocopherylglucoside, D- $\alpha$ -tocopherylmaltoside, D- $\beta$ -tocopherylglucoside, D- $\beta$ -tocopherylmaltoside, D- $\gamma$ -tocopherylglucoside, D- $\gamma$ -tocopherylmaltoside, D- $\delta$ -tocopherylglucoside, D- $\delta$ -tocopherylmaltoside, L- $\alpha$ -tocopherylglucoside, L- $\alpha$ -tocopherylmaltoside, L- $\beta$ -tocopherylglucoside, L- $\beta$ -tocopherylmaltoside, L- $\gamma$ -tocopherylglucoside, L- $\gamma$ -tocopherylmaltoside, L- $\delta$ -tocopherylglucoside, L- $\delta$ -tocopherylmaltoside, 1-(sulphoethylamino)-3-( $\alpha$ -tocopheryl-6-yloxy)propan-2-ol, 1-(carboxypropylamino)-3-( $\alpha$ -tocopheryl-6-yloxy)propan-2-ol hydrochloride, S-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-hydroxypropyl]cystein, S-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-hydroxypropyl]- $\gamma$ -glutamyl cystenyl glycine, N-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-hydroxypropyl]aspartic acid, and N-[3-( $\alpha$ -tocopheryl-6-yloxy)-2-hydroxypropyl]glutamic acid), tocotrienol or salts thereof and their derivatives (such as  $\alpha$ -tocotrienol,  $\beta$ -tocotrienol,  $\gamma$ -tocotrienol,  $\delta$ -tocotrienol, tocotrienol acetate, tocotrienol nicotinate, tocotrienol succinate, tocotrienol linoleate, and tocotrienol orotate), dihydropyridine derivatives



(methyl-3-phenyl-2-propenyl 1,4-dihydro-2,6-dimethyl-4-(3-nitrophenyl)pyridine-3,5-dicarboxylate or salts thereof), benzochroman derivatives, nordihydroguaiaretic acid, butylhydroxytoluene (BHT), butylhydroxyanisole (BHA), hydroxytyrosol, parahydroxyanisole, propyl gallate, sesamol, sesamol, gossypol, maritimein, sulfuretin, xanthene-2,7-diols, caffeoylquinic acids, propolis, carotenoids (such as  $\alpha$ -carotene,  $\beta$ -carotene,  $\gamma$ -carotene, lycopene, lutein, violaxanthin, spirilloxanthin, sphaeroiden, and astaxanthin), phlorotannin, Akebia quinata extract, Hydrangea serrata extract, oolong tea extract, Psoralea corylifolia extract, Cymbidium kanran extract, Fortunella japonica extract, Rhus chinensis extract, Geranium thunbergii extract, sesame extract, sesame cultured cell extract, Scrophularia buergeriana extract, rice bran extract, Japanese pepper extract, Pyrus communis extract, Rheum palmatum extract, tomato extract, Nandina domestica extract, Cirsium japonicum extract, Rosa multiflora extract, paprika extract, pistachio extract, Japanese medlar extract, betel palm extract, Petasites japonicus extract, Chaenomeles speciosa extract, Inula linariifolia extract, Ephedra extract, mimosa extract, Ocimum basilicum extract, Berchemia lineata extract, Persicaria hydropiper extract, Buddleia officinalis extract, Chlamydomonas extract, Sarcodes sanguinea extract, Padina crassa extract, Padina japonica extract, Hypericum erectum extract, Hamamelis virginiana extract, Eugenia caryophyllate extract, Meliisa officinalis extract, Isodon japonicus extract, white birch extract, sage extract, rosemary extract, Nandina domestica, ginkgo extract, green tea extract, clove extract, and so on.

[0053]

(18) Active oxygen eliminator/radical eliminator

Superoxide dismutase, catalase, glutathione peroxidase, bilirubin, quercetin, quercitrin, catechin, catechin derivatives, rutin and derivatives thereof, gallic acid or salts thereof and their derivatives, curcumine or salts thereof and their derivatives, transferrin, ceruloplasmin, coenzyme Q, uric acid, bilirubin, metallothionein, stilbene galloyl glycosides (such as 3,5,4'-trihydroxystilbene 4'-o- $\beta$ -D-(6''galloyl)glucopyranoside and 3,5,4'-trihydroxystilbene 4'-o- $\beta$ -D-(2''galloyl)glucopyranoside), phospholipid chlorogenic acid ester, sphingosine chlorogenic acid ester and derivatives thereof, glycolipid chlorogenic acid ester, sugar chlorogenic acid ester, sterol chlorogenic acid ester, thiazole derivatives or salts thereof (2-(3,4-diethoxyphenyl)-4-(3-carboxy-4-hydroxyphenyl)thiazole, 2-(3,4-diethoxyphenyl)-4-[3-carboxy-4-hydroxy-5-(2-methyl-2-propenyl)phenyl]thiazole, 2-(3,4-diethoxyphenyl)-4-(3-carboxy-4-hydroxy-5-methylphenyl)thiazole, and 2-(3,4-diethoxyphenyl)-4-(3-carboxy-5-methoxyphenyl)thiazole), hydroxymatairesinol, allohydroxymatairesinol, hydantoin derivatives, Haematoxylon campechianum extract, Mallotus japonicus extract, Rubia cordifolia extract, Rubia tinctorum extract, Rubia argyi extract, hydrangea extract, Quercus variabilis extract, Ficus carica extract, ginkgo extract, asparagus extract, Prunus mume extract, Arctostaphylos uva-ursi extract, estragon extract, Sophora japonica extract, Quercus dentata extract, Inula salicina extract, birch extract, Betula extract, Quercus acutissima

extract, *Nerium indicum* extract, *Citrus kinokuni* (*Citrus leiocarpa*, *Citrus tachibana*, *Citrus tangerina*, *Citrus tumida*, *sagamikoji*, *Citrus reticulata*) extract, *santalum* extract, coffee extract, *Comfrey* extract, bamboo extract, *Perilla frutescens* extract, *Perilla frutescens viridis* extract, *Perilla frutescens crispa* extract, *Perilla frutescens discolor* extract, *Paeonia lactiflora* extract, *Quercus serrata* extract, *Quercus crispula* extract, *Lagerstroemia indica* extract, *Lycium chinense* extract, *Quercus myrsinaefolia* extract, *Trifolium repens* extract, horseradish extract, black tea extract, green tea extract, leopard plant extract, *Rubus suavissimus* extract, *Lindera strychnifolia* extract, *Rosa laevigata* extract, peanut extract, *Cinnamomum* extract, *Cinnamomum sieboldii* extract, Ceylon cinnamon extract, *Cinnamomum japonicum* extract, Cinnamon zeylanicum extract, *Campsis grandiflora* extract, lotus extract, Chinese cabbage extract, naked oats extract, *Anemarrhena asphodeloides* extract, rose extract, barbasco extract, spinach extract, *Fagus crenata* extract, *Fagus grandifolia* extract, *Fagus japonica* extract, *Fagus sylvatica* extract, *Calystegia japonica* extract, *hosobanaokera* extract, *Paeonia suffruticosa* extract, marjoram extract, melon extract, *Oenothera stricta* extract, *Spiraea thunbergii* extract, orchid extract, *Momordica grosvenori* extract, rooibos extract, *Portieria japonica* extract, *Plocamium telfairiae* extract, *Plocamium leptophyllum* extract, *Betula grossa* extract, basil extract, *Saussurea costus* extract, and so on.

[0054]

(19) Fat metabolism promoter

Phthalazine derivatives (such as 4-ethyl-1-( $\beta$ -hydroxyethylamino)phthalazine, 4-N-propyl-1-( $\beta$ -hydroxyethylamino)phthalazine, 4-N-butyl-1-( $\beta$ -hydroxyethylamino)phthalazine, and 4-N-butyl-1-( $\beta$ -hydroxypropylamino)phthalazine), xanthene derivatives (such as caffeine, theophylline, theobromine, xanthine, aminophylline, cholintheophylline, diprophylline, proxyphylline, and oxtriphylline), *Cocculus trilobus* extract, *Cirsium japonicum* extract, *Breia segetum* extract, *Cirsium borealinipponense* extract, *Cirsium maritimum* extract, *Cirsium japonicum* extract, *Rhaponticum uniflorum* extract, cacao extract, *Hercampuri* extract, *Sinomenium acutum* extract, *Curcuma zedoaria* extract, *Fumaria officinalis* extract, *Platycodon grandiflorum* extract, *Hedera rhombea* extract, pepper extract, *Cola acuminata* extract, *Alisma plantago-aquatica* var. *orientale* extract, *Citrus maxima* extract, *Cornus officinalis* extract, *Sinomenium acutum* extract, *Sinomenium acutum* (Thunb.) extract, *Polyporus umbellatus* extract, *Centella asiatica* extract, *Gelidium crinale* extract, *Gentiana scabra* Bunge extract, *Gentiana scabra* Bunge var. *scabra* extract, *Elsholtzia ciliata* extract, banana extract, Puer tea extract, plum extract, *Ledebouriella seseloides* extract, and so on.

[0055]

(20) Antiinflammatory agent/interleukin production inhibitor/antiphlogistic agent

Quinolinon derivatives, dibenzoxepin derivatives, thiotropocin, phthalimide derivatives, flurbiprofen, felbinac, bufexamac, suprofen, 1,4-diphenylpropylpyperadine derivatives, calxine compounds, chromanol glycosides (2-( $\alpha$ -D-

glucopyranosyl)methyl-2,5,7,8-tetramethylchroman-6-ol),  
ichthammol, indomethacin, kaolin, diphenhydramine hydrochloride,  
d-camphor, DL-camphor, salicylic acid, sodium salicylate, methyl  
salicylate, acetylsalicylic acid, hydrocortisone, guaiazulen,  
chamazulen, chlorpheniramine maleate, diphenhydramine  
hydrochloride, clemastine fumarate, cyproheptadine hydrochloride,  
promethazine hydrochloride, pyperadine derivatives,  $\alpha$ -D-  
phenylglucoside derivatives, glycyrrhizic acid or salts thereof  
and their derivatives (such as  $\alpha$ -glycyrrhizic acid,  $\beta$ -  
glycyrrhizic acid, methyl  $\alpha$ -glycyrrhizinate, methyl  $\beta$ -  
glycyrrhizinate, trisodium  $\alpha$ -glycyrrhizinate, monopotassium  $\alpha$ -  
glycyrrhizinate, dipotassium  $\alpha$ -glycyrrhizinate, monoammonium  $\alpha$ -  
glycyrrhizinate, trisodium  $\beta$ -glycyrrhizinate, monopotassium  $\beta$ -  
glycyrrhizinate, dipotassium  $\beta$ -glycyrrhizinate, and monoammonium  
 $\beta$ -glycyrrhizinate), glycyrrhetinic acid or salts thereof and  
their derivatives (such as  $\alpha$ -glycyrrhetinic acid,  $\beta$ -  
glycyrrhetinic acid, stearyl  $\alpha$ -glycyrrhetinate, stearyl  $\beta$ -  
glycyrrhetinate, pyridoxine  $\alpha$ -glycyrrhetinate, pyridoxine  $\beta$ -  
glycyrrhetinate, glycerin  $\alpha$ -glycyrrhetinate, glycerin  $\beta$ -  
glycyrrhetinate, and disodium 3-succinyloxyglycyrrhetinate),  
mefenamic acid, phenylbutazone, ibuprofen, ketoprofen, allantoin,  
calcium pantothenate, pantothenol or salts thereof and their  
derivatives such as pantothenyl ethyl ether,  $\epsilon$ -aminocaproic acid,  
diclofenac sodium, tranexamic acid and derivatives thereof (such  
as trans-4-benzyloxycarbonylaminomethylcyclohexanecarboxylic  
acid, trans-4-p-  
nitrobenzyloxycarbonylaminomethylcyclohexanecarboxylic acid,  
trans-4-p-

chlorobenzoyloxycarbonylaminomethylcyclohexanecarboxylic acid,  
 trans-4-p-bromobenzoyloxycarbonylaminomethylcyclohexanecarboxylic  
 acid, trans-4-m-  
 chlorobenzoyloxycarbonylaminomethylcyclohexanecarboxylic acid,  
 trans-4-p-  
 methoxybenzoyloxycarbonylaminomethylcyclohexanecarboxylic acid,  
 trans-4-p-  
 methylbenzoyloxycarbonylaminomethylcyclohexanecarboxylic acid,  
 sodium trans-4-  
 benzoyloxycarbonylaminomethylcyclohexanecarboxylate, ammonium  
 trans-4-p-  
 nitrobenzoyloxycarbonylaminomethylcyclohexanecarboxylate,  
 potassium trans-4-p-  
 chlorobenzoyloxycarbonylaminomethylcyclohexanecarboxylate,  
 potassium trans-4-p-  
 bromobenzoyloxycarbonylaminomethylcyclohexanecarboxylate,  
 potassium trans-4-m-  
 chlorobenzoyloxycarbonylaminomethylcyclohexanecarboxylate,  
 magnesium trans-4-p-  
 methoxybenzoyloxycarbonylaminomethylcyclohexanecarboxylate,  
 monoethanolamine trans-4-p-methylbenzoyloxy  
 carbonylaminomethylcyclohexanecarboxylate, trans-4-t-  
 butyloxycarbonylaminomethylcyclohexanecarboxylic acid, trans-4-  
 (2-phenylisopropylloxycarbonylaminomethyl)cyclohexanecarboxylic  
 acid, trans-4-(p-  
 biphenylisopropylloxycarbonylaminomethyl)cyclohexanecarboxylic  
 acid, trans-4-(3,5-  
 dimethoxyphenylisopropylloxycarbonylaminomethyl)cyclohexanecarbox

ylic acid, trans-4-(p-  
 methylphenylisopropylloxycarbonylaminomethyl)cyclohexanecarboxyli  
 c acid, sodium trans-4-t-butyloxycarbonylaminomethyl  
 cyclohexanecarboxylate, potassium trans-4-(2-  
 phenylisopropylloxycarbonylaminomethyl)cyclohexanecarboxylate,  
 calcium trans-4-(p-  
 biphenylisopropylloxycarbonylaminomethyl)cyclohexanecarboxylate,  
 magnesium trans-4-(3,5-  
 dimethoxyphenylisopropylloxycarbonylaminomethyl)cyclohexanecarboxy  
 late, monoethanolamine trans-4-(p-  
 methylphenylisopropylloxycarbonylaminomethyl)cyclohexanecarboxyate  
 e, trans-4-(9-  
 fluorenylmethylloxycarbonylaminomethyl)cyclohexanecarboxylic acid,  
 trans-4-  
 methylsulfonylethylloxycarbonylaminomethylcyclohexanecarboxylic  
 acid, sodium trans-4-(9-  
 fluorenylmethylloxycarbonylaminomethyl)cyclohexanecarboxylate,  
 potassium trans-4-  
 methylsulfonylethylloxycarbonylaminomethylcyclohexanecarboxylate,  
 trans-4-(pyridine-4'-  
 methylloxycarbonylaminomethyl)cyclohexanecarboxylic acid, trans-  
 4-(2,2,2-  
 trichloroethyloxycarbonylaminomethyl)cyclohexanecarboxylic acid,  
 potassium trans-4-(2-  
 trimethylsilylethoxycarbonylaminomethyl)cyclohexanecarboxylate,  
 sodium trans-4-(pyridine-4'-  
 methylloxycarbonylaminomethyl)cyclohexanecarboxylate, potassium  
 trans-4-(2,2,2-

trichloroethyloxycarbonylaminomethyl)cyclohexanecarboxylate, and calcium trans-4-(2-trimethylsilylethoxycarbonylaminomethyl)cyclohexanecarboxylate), sulfatide, astaxanthin fatty acid diester (such as astaxanthin dilauroic acid ester, astaxanthin dimyristic acid ester, astaxanthin dipentadecanoic acid ester, astaxanthin dipalmitic acid ester, astaxanthin dipalmitoleic acid ester, astaxanthin diheptadecanoic acid ester, astaxanthin dielaidic acid ester, astaxanthin direcinoleic acid, astaxanthin petroselinic acid ester, astaxanthin vaccenic acid ester, astaxanthin eleostearic acid ester, astaxanthin punycinic acid ester, astaxanthin licanic acid ester, astaxanthin palynolic acid ester, astaxanthin gadolic acid ester, astaxanthin 5-eicosenoic acid ester, astaxanthin 5-docosenoic acid ester, astaxanthin cetolic acid ester, astaxanthin ercinoic acid ester, astaxanthin 5,13-docosadienoic acid ester, astaxanthin celacholic acid ester, astaxanthin decenoic acid ester, astaxanthin stering acid ester, astaxanthin dodecenoic acid ester, astaxanthin dioleic acid ester, astaxanthin distearic acid ester, astaxanthin dieicosapentaenoic acid ester, astaxanthin didocosahexaenoic acid ester, astaxanthin dilinoleic acid ester, astaxanthin dilinolenic acid ester, and astaxanthin diarachidonic acid), astaxanthin diglycerophosphoric acid ester (such as astaxanthin diglycerophosphate, astaxanthin glycerophosphoric acid palmitate, astaxanthin glycerophosphatidylcholine palmitate, astaxanthin glycerophosphatidylcholine DHA, astaxanthin glycerophosphatidylinositol palmitate, astaxanthin glycerophosphatidylinositol DHA, astaxanthin



glycerophosphatidylinositol linoleate, and astaxanthin glycerophosphatidylcholine linoleate), steviol glycosides, benzimidazole derivatives (such as 1-(2-ethoxyethyl)-2-[1-(2-(4-(1-(4,4-dimethyl-2-oxazolin-2-yl)-1-methylethyl)phenyl)ethyl)piperidin-4-yl]-1H-benzimidazole, 2-[4-(2-(4-(1-(2-ethoxyethyl)benzimidazol-2-yl)piperidin-1-yl)ethyl)phenyl]-2-methylpropanoic acid, ethyl 2-[4-(2-(4-(1-(2-ethoxyethyl)benzimidazol-2-yl)piperidin-1-yl)ethyl)phenyl]-2-methylpropanoate, 1-(2-ethoxyethyl)-2-[1-(2-(4-(1,1-dimethyl-2-hydroxyethyl)phenyl)ethyl)piperidin-4-yl]-1H-benzimidazol, 1-(2-hydroxyethyl)-2-[1-(2-(4-(1-(4,4-dimethyl-oxazolin-2-yl)-1-methylethyl)phenyl)ethyl)piperidin-4-yl]-1H-benzimidazol, and 2-[4-(2-(4-(1-(2-hydroxyethyl)benzimidazol-2-yl)piperidin-1-yl)ethyl)phenyl]-2-methylpropanoic acid), alanine derivatives or salts thereof (such as N-{3-isopentyl-4-methyl-2-[4-(3-trifluoromethylbenzamide)benzoylimino]-3H-thiazoline-5-carbonyl}-L-alanine, N-{3-isopentyl-4-methyl-2-[4-(3-trifluoromethylbenzamide)benzoylimino]-3H-thiazoline-5-carbonyl}-2-methylalanine, and N-{3-isopentyl-4-methyl-2-[4-(3-trifluoromethylbenzamide)benzoylimino]-3H-thiazoline-5-carbonyl}-N-methyl-L-alanine), thiazoline derivatives or salts thereof (such as 3-isopentyl-4-methyl-2-[4-(3-trifluoromethylbenzamide)benzoylimino]-3H-thiazoline-5-carboxylic acid, and 4-isobutyl-3-methyl-2-[4-(3-trifluoromethylbenzamide)benzoylimino]-3H-thiazoline-5-carboxylic acid), chlorpheniramine maleate, diphenhydramine hydrochloride, diphenylpyrarine hydrochloride, carbinoxamine maleate, hydrocortisone butyrate, sulfated acidic

mucopolysaccharides or salts thereof, and sulfated dextran or salts thereof, Glycyrrhiza extract, shikon extract, rosa multiflora fruit extract, propolis, polygonum tinctorium extract, avocado extract, Polygonatum officinale extract, Fritillaria verticillata extract, Fritillaria extract, Elephantopus extract, Polygonum bistorta extract, turmeric extract, echinacea (E. angustifolia) extract, Coptidis japonica extract, Inula britannica extract, Hypericum extract, orange extract, cassia extract, Tetrapanax papyriferus extract, Agastache rugosa extract, Artemisia capillaris extract, watercress extract, Smilax glabra extract, gentiana extract, Dendrobium nobile extract, Ligusticum sinense extract, Alpinia officinarum extract, Rubus chingii extract, Cremastra appendiculata extract, cherry extract, salvia extract, digitalis extract, Thilia japonica extract, Shorea robusta extract, Ficus religiosa extract, Amomum xanthioides extract, Coix lacryma-jobi extract, Nandina domestica extract, Hedera helix extract, Filipedula ulmaria extract, Achillea millefolium extract, Polygala senega extract, Echinops grijisii extract, scythian lamb extract, Thymus vulgaris extract, Stephania cepharantha extract, Persicae semen extract, Imperata cylindrica extract, Benincasa hispida extract, Houttuynia cordata extract, parsley extract, Tribulus terrestris extract, Cyperus rotundus extract, water chestnut extract, Althea officinalis extract, Piper kadzura extract, Vigna radiata extract, Santalum album extract, Butcher's broom extract, pansy extract, Chrysanthemum lavandulifolium extract, Arisaema heterophyllum extract, Citrus aurantium extract, miracle fruit extract, Aphananthe aspera extract, peach extract, Centaurea

cyanus extract, Myrica gale extract, mistletoe extract, Ardisia japonica extract, Artemisia montana extract, mugwort extract, rosemary extract, Polygala tenuifolia extract, Chaetomorpha spiralis extract, Chaetomorpha moniligera extract, Chaetomorpha okamurai extract, Desmarestia ligulata extract, Desmarestia viridis extract, Myelophycus simplex extract, Sargassum horneri extract, Sargassum micracanthum extract, Neodilsea yendoana extract, Neodilsea tenuipes extract, Ahnfeltiopsis paradoxa extract, Palmaria palmata extract, Chondria crassicaulis extract, belladonna extract, Magnolia obovata extract, Ulmus davidiana extract, and so on.

[0056]

(21) Blood flow-increasing agent/blood vessel-stimulating agent

Tocopherol or salts thereof and their derivatives, tocotrienol or salts thereof and their derivatives, cepharanthine, capronium chloride, eugenol derivatives (such as acetyl eugenol, methyl eugenol, methyl isoeugenol, ethyl eugenol, ethyl isoeugenol, and eugenol salicylate), minoxidil, capsicum tincture, vanilamide nonilate, cantharis tincture, ginger tincture, mint oil, L-menthol, camphor, benzyl nicotinate, cinnarizine, tolazoline, acetylcholine, verapamil, ichthammol,  $\alpha$ -borneol, cyclandelate, vanillylamide nonylate, capsaicin, zingerone, Swertia japonica extract, garlic extract, ginseng extract, aloe extract, gentiana extract, Angelica acutiloba extract, Angelica keiskei extract, Arnica montana extract, Scirpus yagara extract, Anethum graveolens extract, Citrus unshui extract, Siberian hazelnut extract, persimmon extract,

Disopyros Kaki extract, Cinchona succirubra extract, Cymbidium pumilum extract, Verbena officinalis extract, Papaver rhoeas extract, Nuphar japonicum extract, Arctium lappa extract, Lobelia sessiflora extract, Forsythia viridissima extract, ginger extract, Acorus calamus extract, hawthorn extract, Swertia japonica extract, Citrus aurantium extract, Salvia miltiorrhiza extract, thyme extract, Panax japonicus extract, Polygonum multiflorum extract, Codonopsis lanceolata extract, capsium extract, Angelica acutiloba extract, Ligustrum lucidum extract, Citrus natsudaiddai extract, Sambucus sieboldiana extract, Corylus heteophylla extract, Scopolia japonica (root) extract, Mentha arvensis extract, Glehnia littoralis extract, Echinops setifer extract, Daphne genkwa extract, blackcurrant extract, Tilia miqueliana extract, Citrus junos extract, Chimonanthus praecox extract, Ostericum sieboldii extract, hibiscus extract, rosehip extract, and so on.

[0057]

(22) Antiandrogenic agent

Estrogenic hormones (such as estrone, estradiol, and ethynyl estradiol), isoflavone, oxendolone, 4',5,7-trihydroxy-8-prenylflavanone, 4',5,7-trihydroxy-8-prenylflavone, 3,3',4',5,7-pentahydroxy-8-prenylflavone, nicorandil, and cyclosporinic acid, and so on.

[0058]

(23) Agent inhibiting structural protein-degrading enzyme (matrix metalloprotease such as elastase, collagenase, keratin protease, serine protease, integrin-degrading enzyme,

involucrin-degrading enzyme, filaggrin-degrading enzyme, laminin-degrading enzyme, fibronectin-degrading enzyme, and proteoglycan-degrading enzyme)

Carbostyryl derivatives or salts thereof, dicarboxylic acids (glutaric acid, adipic acid, pimelic acid, suberic acid, azelaic acid, sebacic acid, 1,9-nonamethylenedicarboxylic acid, and 1,10-decamethylenedicarboxylic acid), rosmarinic acid, urusolic acid, oleanolic acid, hydroxamic acid derivatives, esculetin derivatives, anthocyanidins, nordihydroguaiaretic acid, 20-carboxy-16-hydroxy-21-nor-5  $\alpha$ -7,9(11)-lanostadiene-3,24-dione, ubiquinone, plastaquinone, juglone, shikonin, quinizarin, alizarin, abietine, levopimaric acid, betulin,  $\alpha$ -amylase, catechin compounds (such as catechin, epigallocatechin, epigallocatechin gallate, epicatechin, epicatechin gallate, and catechin rhamnopyranoside catechin), diisopropyl fluorophosphate, dimethyl (2R,6R)-2,6-dihydroxy-4-(tert-butyldimethylsilyloxy)-(3Z)-heptene-1,7-dicarboxylate, N,N'-bis[(1S,2R)-2-hydroxyindan-1-yl]-(2R,6R)-2,6-dibenzyloxy-4-hydroxyheptane dicarboxylic-1,7-diamide, dimethyl (2R,6R)-2,6-dihydroxy-4-(tert-butyldimethylsilyloxy)heptane-1,7-dicarboxylate, dimethyl (2R,6R)-2,6-dibenzyloxy-4-(tert-butyldimethylsilyloxy)heptane-1,7-dicarboxylate, (2R,6R)-2,6-dibenzyloxy-4-(tert-butyldimethylsilyloxy)heptane-1,7-dicarboxylic acid, N,N'-bis[(1S,2R)-2-hydroxyindan-1-yl]-(2R,6R)-2,6-dibenzyloxy-4-(tert-butyldimethylsilyloxy)oxypentane-1,7-dicarboxylic acid diamide, N,N'-bis[(1S,2R)-2-hydroxyindan-1-yl]-(2R,6R)-2,6-dibenzyloxy-4-hydroxyheptane-1,7-dicarboxylic acid diamide, N,N'-bis[(1S,2R)-2-hydroxyindan-1-yl]-(2R,6R)-2,4,6-

trihydroxyheptane-1,7-dicarboxylic acid diamide, N,N'-  
 bis[(1S,2R)-2-hydroxyindan-1-yl]-(2S,6S)-2,6-dibenzyloxy-4-  
 hydroxyheptane-1,7-dicarboxylic acid diamide, dimethyl (2S,6S)-  
 2,6-dihydroxy-4-(tert-butyldimethylsilyloxy)-(3Z)-heptene-1,7-  
 dicarboxylate, dimethyl (2S,6S)-2,6-dihydroxy-4-(tert-  
 butyldimethylsilyloxy)heptane-1,7-dicarboxylate, dimethyl  
 (2S,6S)-2,6-dibenzyloxy-4-(tert-butyldimethylsilyloxy)heptane-  
 1,7-dicarboxylate, (2S,6S)-2,6-dibenzyloxy-4-(tert-  
 butyldimethylsilyloxy)heptane-1,7-dicarboxylic acid, N,N'-  
 bis[(1S,2R)-2-hydroxyindan-1-yl]-(2S,6S)-2,6-dibenzyloxy-4-  
 (tert-butyldimethylsilyloxy)heptane-1,7-dicarboxylic acid diamide,  
 N,N'-bis[(1S,2R)-2-hydroxyindan-1-yl]-(2R,6R)-2,6-dibenzyloxy-4-  
 hydroxyheptane-1,7-dicarboxylic acid diamide, 3-[[4-(4-  
 fluorophenoxy)-benzenesulfonyl]-(1-hydroxycarbamoylcyclopentyl)-  
 amino]-propionic acid, 4-[4-(4-fluorophenoxy)-  
 benzenesulfonylamino]-tetrahydropyran-4-carboxylic acid  
 hydroxyamide, 4-[4-(4-chlorophenoxy)-benzenesulfonylmethyl]-  
 tetrahydropyran-4-carboxylic acid hydroxyamide, 3-[[4-(4-  
 fluorophenoxy)-benzenesulfonyl]-(1-hydroxycarbamoylcyclobutyl)-  
 amino]-propionic acid, 4-(4'-chlorobiphenyl-4-yl)-2-[2-(1,3-  
 dioxo-1,3-dihydroisoindol-2-yl)-ethyl]-4-oxobutyric acid, {1-[4-  
 (4-fluorobenzyloxy)-benzenesulfonyl]-2-  
 hydroxycarbamoylpiperidin-3-yl}carbamic acid isopropyl ester, 2-  
 [4-(4-fluorophenoxy)-benzenesulfonylamino]-N-hydroxy-2-  
 methylpropionamide, 3-[4-(4-fluorophenoxy)-benzenesulfonyl]-2,N-  
 dihydroxypropionamide, 3-(4-phenoxybenzenesulfonyl)-7-  
 oxabicyclo[2.2.1]heptane-2-carboxylic acid hydroxyamide, (4-  
 benzylbenzyl)-[2-(2,2-dimethyl-1-

methylcarbamoylpropylcarbamoyl)-4-(4'-fluorobiphenyl-4-yl)-butyl]-phosphinic acid, 2-amino-3-[4-(4-fluorophenoxy)-benzenesulfonyl]-N-hydroxypropionamide, N-hydroxy-2-(4-phenylpiperidine-1-sulfonyl)-acetamide, *Thymus serpyllum* extract, *Prunella vulgaris* extract, *Lagerstroemia speciosa* extract, *Crataegus pinnatifida* extract, *Crataegus cuneata* extract, *Magnolia officinalis* extract, guava extract, *Schisandra chinensis* extract, *Plantago asiatica* extract, *Rosa centifolia* extract, *Hypericum perforatum* extract, *Stellaria media* extract, *Achyranthes fauriei* extract, *Magnolia obovata* extract, fox grape extract, European grape extract, *Vitis coignetiae* extract, madarin extract, *Bupleurum scorzoneraefolium* extract, *Scutellaria baicalensis* extract, *Hypericum erectum* extract, *Sophora flavescens* extract, Mullberry extract, cinnamomum extract, *Geranium thunbergii* extract, Comfrey extrac, sage extrac, European elder extract, *Tilia miqueliana* extract, Cortex moutan extract, and so on.

[0059]

#### (24) Structural protein synthesis promoter

Ethanolamine derivatives, pentoxifylline, serine derivatives, geraniol, crocetin, methyl 4-(2-ethylhexyloxy)-2-hydroxybenzoate, methyl 2-hydroxy-4-(3,5,5-trimethylhexyloxy)benzoate, methyl 4-cyclohexylmethoxy-2-hydroxybenzoate, methyl 4-(2-cyclohexylethoxy)-2-hydroxybenzoate, methyl 4-(3,7-dimethyl-6-octenyloxy)-2-hydroxybenzoate, ethyl 3-(2-ethylhexyloxy)-5-hydroxybenzoate, methyl 5-(2-ethylhexyloxy)-2-hydroxybenzoate, methyl 2-hydroxy-5-(3,5,5-trimethylhexyloxy)benzoate, methyl 5-(2-cyclohexylethoxy)-2-hydroxybenzoate, methyl 4-N-hexyloxy-2-

hydroxybenzoate, methyl 2-hydroxy-4-N-octyloxybenzoate, methyl  
4-N-decyloxy-2-hydroxybenzoate, methyl 5-N-hexyloxy-2-  
hydroxybenzoate, 4-(2-ethylhexyloxy)-2-hydroxybenzoic acid, 2-  
hydroxy-4-(2,5,5-trimethylhexyloxy)benzoic acid, 4-  
cyclohexylmethoxy-2-hydroxybenzoic acid, 4-(2-cyclohexylethoxy)-  
2-hydroxybenzoic acid, 4-(3,7-dimethyl-6-octenyloxy)-2-  
hydroxybenzoic acid, 3-(2-ethylhexyloxy)-5-hydroxybenzoic acid,  
5-(2-ethylhexyloxy)-2-hydroxybenzoic acid, 5-(2-ethylhexyloxy)-  
2-hydroxybenzoic acid, 2-hydroxy-5-(3,5,5-  
trimethylhexyloxy)benzoic acid, 5-(2-cyclohexylethoxy)-2-  
hydroxybenzoic acid, 4-N-hexyloxy-2-hydroxybenzoic acid, 5-N-  
hexyloxy-2-hydroxybenzoic acid, 2-hydroxy-4-N-octyloxybenzoic  
acid, 4-N-decyloxy-2-hydroxybenzoic acid, N-(2-hydroxyethyl)-4-  
(2-ethylhexyloxy)-2-hydroxybenzamide, N-ethyl-4-(2-  
ethylhexyloxy)-2-hydroxybenzamide, 2-acetoxy-4-  
cyclohexylmethoxybenzoic acid, sodium 4-(2-ethylhexyloxy)-2-  
hydroxybenzoate, methyl 4-{{(2E)-3,7-dimethyl-2,6-octadienyloxy}}-  
2-hydroxybenzoate, ethyl 4-{{(2E)-3,7-dimethyl-2,6-  
octadienyloxy}}-2-hydroxybenzoate, ethyl 5-{{(2E)-3,7-dimethyl-  
2,6-octadienyloxy}}-2-hydroxybenzoate, ethyl 3-{{(2E)-3,7-  
dimethyl-2,6-octadienyloxy}}-2-hydroxybenzoate, ethyl 3-{{(2E)-  
3,7-dimethyl-2,6-octadienyloxy}}-5-hydroxybenzoate, ethyl 4-  
{{(2E)-3,7-dimethyl-2,6-octadienyloxy}}-3-methoxybenzoate, methyl  
4-{{(2E,6E)-3,7,11-trimethyl-2,6,10-dodecatrienyl}}-2-  
hydroxybenzoate, (2E)-3,7-dimethyl-2,6-octadienyl 4-{{(2E)-3,7-  
dimethyl-2,6-octadienyloxy}}-2-hydroxybenzoate, 4-{{(2E)-3,7-  
dimethyl-2,6-octadienyloxy}}-2-hydroxybenzoic acid, 5-{{(2E)-3,7-  
dimethyl-2,6-octadienyloxy}}-2-hydroxybenzoic acid, 3-{{(2E)-3,7-



dimethyl-2,6-octadienyloxy}-2-hydroxybenzoic acid, 3-((2E)-3,7-dimethyl-2,6-octadienyloxy)-5-hydroxybenzoic acid, 2-hydroxy-4-((2E,6E)-3,7,11-trimethyl-2,6,10-dodecatrienyloxy)benzoic acid, 4-((2E)-3,7-dimethyl-2,6-octadienyloxy)-3-methoxybenzoic acid, 2-acetoxy-4-((2E)-3,7-dimethyl-2,6-octadienyloxy)benzoic acid, N-(2-hydroxyethyl)-4-((2E)-3,7-dimethyl-2,6-octadienyloxy)-2-hydroxybenzamide, 4-((2E)-3,7-dimethyl-2,6-octadienylamino)-2-hydroxybenzoic acid, dimethyl 2,6-octadienyloxy}benzoate, N-(2-hydroxyethyl)-4-((2E)-3,7-dimethyl-2,6-octadienyloxy)-2-hydroxybenzamide, 4-((2E)-3,7-dimethyl-2,6-octadienylamino)-2-hydroxybenzoic acid, 3-dodecyloxybenzoic acid, 3-(12-hydroxydodecyloxy)benzoic acid, 4-dodecyloxybenzoic acid, 4-(12-hydroxydodecyloxy)benzoic acid, 3-(12-hydroxyoctadecyloxy)benzoic acid, 4-(12-hydroxyoctadecyloxy)benzoic acid, 3-(11-hydroxyundecyloxy)benzoic acid, 4-(11-hydroxyundecyloxy)benzoic acid, 3-((2E)-3,7-dimethyl-2,6-octadienyloxy)benzoic acid, 4-((2E)-3,7-dimethyl-2,6-octadienyloxy)benzoic acid, 3-((2E,6E)-3,7,11-trimethyl-2,6,10-dodecatrienyloxy)benzoic acid, 4-((2E,6E)-3,7,11-trimethyl-2,6,10-dodecatrienyloxy)benzoic acid, 4-[3,7-dimethyl-9-(2,6,6-trimethyl-1-cyclohexen-1-yl)-2,4,6,8-nonatetraenyloxy]benzoic acid, 4-[3,4-dihydro-2,5,7,8-tetramethyl-2-(4,8,12-trimethyltridecyl)-2H-1-benzopyran-6-oxy]benzoic acid, 4-((2E,6E)-3,7,11-trimethyl-2,6,10-dodecatrienyloxy)benzamide, 4-((2E)-3,7-dimethyl-2,6-octadienyloxy)benzamide, 4-(2-methyl-2-butenyloxy)benzamide, 4-(2-ethylhexyloxy)benzamide, 4-dodecyloxybenzamide, 4-(12-hydroxydodecyloxy)benzamide, 4-(12-hydroxyoctadecyloxy)benzamide,

4-(11-hydroxyundecyloxy)benzamide, 4-(10-hydroxydecyloxy)benzamide, 4-isostearyloxybenzamide, N-(2-hydroxyethyl)-4-[(2E,6E)-3,7,11-trimethyl-2,6,10-dodecatrienyloxy]benzamide, N,N-dimethyl-4-[(2E,6E)-3,7,11-trimethyl-2,6,10-dodecatrienyloxy]benzamide, N,N-di[(2E)-3,7-dimethyl-2,6-octadienyl]-4-aminobenzamide, 4-[N'-methoxycarbonyl-N-[(2E)-3,7-dimethyl-2,6-octadienylamino]benzamide, 4-[N-acetyl-N-[(2E)-3,7-dimethyl-2,6-octadienyl]aminobenzamide, N-(2-hydroxyethyl)-4-[(2E,6E)-3,7,11-trimethyl-2,6,10-dodecatrienyloxy]-2-hydroxybenzamide, N,N-diethyl-4-[(2E,6E)-3,7,11-trimethyl-2,6,10-dodecatrienyloxy]-2-hydroxybenzamide, *Pisum sativum* extract, *Callophyllis* extract, *Mastocarpus yendoi* extract, *Gigartina ochotensis* extract, *Mastocarpus pacificus* extract, *Ceramium kondoi* extract, *Ceramium tenerrimum* extract, *Ceramium paniculatum* extract, *Ceramium japonicum* extract, *Champia expansa* extract, *Polysiphonia morrowii* extract, *Polysiphonia crassa* extract, *Chondria armata* extract, *Chondria dasyphylla* extract, *Chondria intertexta* extract, *Chondria ryukyuensis* extract, *Chondria expansa* extract, *Chondria lancifolia* extract, *Wasabia japonica* extract, and so on.

[0060]

(25) Mucopolysaccharide (hyaluronic acid, chondroitin sulfate, and so on) degradation enzyme inhibitor

Anacardic acid and derivatives thereof (such as methyl 6-pentadecatrienyl salicylate ether, ethyl 6-pentadecatrienyl salicylate ether, propyl 6-pentadecatrienyl salicylate ether, butyl 6-pentadecatrienyl salicylate ether, methyl 6-pentadecatrienyl salicyl alcohol ether, ethyl 6-pentadecatrienyl

salicyl alcohol ether, propyl 6-pentadecatrienyl salicyl alcohol  
 ether, butyl 6-pentadecatrienyl salicyl alcohol ether, methyl 6-  
 pentadecatrienylsalicylaldehyde ether, ethyl 6-  
 pentadecatrienylsalicylaldehyde ether, propyl 6-  
 pentadecatrienylsalicylaldehyde ether, butyl 6-  
 pentadecatrienylsalicylaldehyde ether, 2-methyl ether-6-  
 pentadecatrienylcinnamic acid, 2-ethyl ether-6-  
 pentadecatrienylcinnamic acid, 2-propyl ether-6-  
 pentadecatrienylcinnamic acid, 2-butyl ether-6-  
 pentadecatrienylcinnamic acid, 2-methyl ether-6-  
 pentadecatrienylcinnamate alcohol, 2-ethyl ether-6-  
 pentadecatrienylcinnamate alcohol, 2-propyl ether-6-  
 pentadecatrienylcinnamate alcohol, and 2-butyl ether-6-  
 pentadecatrienylcinnamate alcohol), polyisoprenylated  
 benzophenone derivatives (such as garcinol, isogarcinol,  
 xanthothimol, isoxanthothimol, and guttiferone), *Epimedium*  
*grandiflorum* extract, *Epimedium sagittatum* extract, *Polygonatum*  
*falcatum* extract, *Polygonatum sibiricum* extract, oregano extract,  
*Dryopteris* extract, *Polygalae* extract, prunus bark extract,  
*Pinellia ternata* extract, *Citrus aurantium* extract, *Lycium*  
*chinense* extract, *Evodia rutaecarpa* extract, senega extract,  
*Melia azedarach* extract, tamarind extract, tarragon extract,  
*Rheum coreanum* extract, *Phyllostachys nigra* extract, daisy  
 extract, myrobalan extract, *Berchemia lineata* extract, hibiscus  
*syriacus* extract, laurel extract, *Cyrtomium fortunei* extract,  
*Ulva pertusa* extract, *Macrocystis integrifolia* extract,  
*Neocystis ruetokeana* extract, *Ptilophora subcostata* extract,  
*Pterocladia capillacea* extract, *Pterocladia densa* extract,

Acanthopeltis hirsuta extract, Gelidiella acerosa extract, Chondrus yendoi extract, Chondrus armatus extract, Caulerpa okamurae extract, Bryopsis plumosa extract, Codium fragile extract, Codium divaricatum extract, Codium contractum extract, Codium cylindricum extract, Codium latum extract, Ceratophyllum demersum extract, Cladosiphono okimuranus extract, Nemacystus decipiens extract, Colpomenia sinuosa extract, Ecklonia cava extract, Gloiopeltis furcata extract, Gloiopeltis tenax extract, and so on.

[0061]

(26) Mucosaccharide synthesis promoter

Stilbene derivatives or salts thereof, morigin or salts thereof and derivatives thereof, N-acetylgulcosamine, Linum extract, Broussonetia papyrifera extract, Broussonetia kazinoki extract, Origanum vulgare extract, Artcarpus altilis extract, Chondrus pinnulatus extract, Chondrus elatus extract, Acrosorium flabellatum extract, Acrosorium venulosum extract, Acrosorium polyneuron extract, Ulva reticulata extract, Ulva arasakii extract, Callophyllis japonica extract, Callophyllis crispata extract, Callophyllis palmata extract, Callophyllis adhaerens extract, Callophyllis adnata extract, Callophyllis cristata extract, Callophyllis hayamensis extract, Callophyllis mageshimensis extract, Callophyllis rhynchocarpa extract, and so on.

[0062]

(27) Intra-cellular lipid production promoter/intra-cellular lipid status improving agent

Phospholipids (such as phosphatidyl ethanol, phosphatidylcholine, phosphatidyltriethanolamine, phosphatidylserine, phosphatidic acid, phosphatidylglycerol, phosphatidylinositol, diacylphosphatidylcholine, diacylphosphatidylethanolamine, diacylphosphatidylinositol, diacylphosphatidylserine, 1-cysteinylphosphatidic acid, 2-cysteinylphosphatidic acid, 1-glutathionylphosphatidic acid, 2-glutathionylphosphatidic acid, 1-azelaoylphosphatidic acid, 2-azelaoylphosphatidic acid, 1-hydroxyacylphosphatidic acid, 2-hydroxyacylphosphatidic acid, ceramide, glucosylceramide, galactosylceramide, cerebroside, phosphatidylglucosylacyl glycerol, N-oleoylsphingosine, N-(12-hydroxyoctadecanoyl)sphingosine, N-(16-hydroxyhexadecanoyl)sphingosine, N-salicyloyl phytosphingosine, sphingomyelin, soybean lecithin, and egg yolk lecithin), N-acetylneuraminic acid (sialic acid), N-glucosolneuraminic acid, gangliosides (galaose, ganglitriaose, ganglitetraose, globotetraose, neolactotetraose, neolactohexaose, and neolactooctaose), oligosulfated hyaluronic acid, hydroxytamoxifen compounds, glyceroglucolipids, pentoxyferin, 3-deazaadenosine, carboxysamide derivatives, inositolpolyamines, sialyl acid, triterpenic acid derivatives, lactose, lactosamine derivatives, sulfated chitin derivatives, albumine, Panax japonicus extract, Panax ginseng extract, Lilium lancifolium extract, Lilium japonicum extract, Lilium brownii extract, Papaver rhoeas extract, and so on.

[0063]

(28) Maillard reaction inhibitor

Aminoguanidine, flavanones (naringin, naringenin, naringin, naringenin, liquiritin, liquiritigenin, digallic acid, luteic acid, ellagic acid, chlorogenic acid, glucogallin, tetralin, hamamelitannin, tannin gallate, tannic acid, geraniin, gallic acid, galloyl gallic acid, ellagitannin, hexagalloylglucose, heptagalloylglucose, tetragalloylglucose, trigalloylglucose, pentagalloylglucose, digalloylquininic acid, and trigalloylquininic acid), 2-hydroxyphenylalkylamine derivatives or salts thereof, phenylpropenoic acid derivatives (such as 3-[2,3-bis(methoxymethoxy)phenyl]propenoic acid, 7-(4-hydroxy-3-methoxyphenyl)hepta-2,4,6-trienoic acid, 3-(3,5-dimethoxy-4-hydroxyphenyl)propenohydrazide, and N'-isopropylidene-3-(2-methoxyphenyl)propenohydrazide), Acorus gramineus extract, Bletilla striata extract, and so on.

[0064]

(29) Testosterone 5- $\alpha$ -reductase activity inhibitor/hair papilla activator/hair growth promoter

$\gamma$ -amino- $\beta$ -hydroxybutyrates (such as methyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, ethyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, propyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, butyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, ethylhexyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, hexadecyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, lauryl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, stearyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, oleyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, benzyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, phenyl  $\gamma$ -amino- $\beta$ -hydroxybutyrate, ethyl glycol  $\gamma$ -amino- $\beta$ -hydroxybutyrate, sorbitol  $\gamma$ -amino- $\beta$ -hydroxybutyrate, polyoxyethyleneglycol  $\gamma$ -amino- $\beta$ -hydroxybutyrate, and glycerin  $\gamma$ -amino- $\beta$ -hydroxybutyrate), amineoxides (such as oleyldimethylamineoxide, stearyldimethylamineoxide,

palmityldimethylamineoxide, myristyldimethylamineoxide,  
 lauryldimethylamineoxide, dimethyl-laurylethoxyamineoxide,  
 dihydroxyethyl-laurylamineoxide, and palm oil  
 alkyl-dimethylamineoxide), alkylbetaines (palm oil fatty acid  
 amide propylbetaine, palm oil alkylbetaine, betaine  
 lauryldimethylaminoacetate, lauric acid amidopropylbetaine,  
 laurylhydroxysulfobetaine, and 2-alkyl-N-carboxymethyl-N-  
 hydroxyethylimidazolinium betaine), pyrimidine N-oxide  
 derivatives (such as 2-amino-4-methyl-6-piperidinopyrimidine-3-  
 oxide, 2-amino-4-methyl-6-(1-pyrrolidinyl)pyrimidine-3-oxide, 2-  
 amino-4-methyl-6-morpholinopyrimidine-3-oxide, 2-amino-4-methyl-  
 6-[1-(4-methylpiperazinyl)pyrimidine-3-oxide, 2-amino-4-(1-  
 hexahydroazepinyl)-6-methylpyrimidine-1-oxide, 2-amino-4-  
 dimethylamino-6-methylpyrimidine-1-oxide, 2-amino-4-allylamino-  
 6-methylpyrimidine-1-oxide, 2-amino-4-benzylamino-6-  
 methylpyrimidine-1-oxide, 2-amino-4,5-methyl-6-  
 piperidinopyrimidine-3-oxide, 2-amino-4-ethyl-6-  
 morpholinopyrimidine-3-oxide, 2-amino-4-methyl-5-nitro-6-  
 piperidinopyrimidine-3-oxide, 2,5-diamino-4-methyl-6-  
 piperidinopyrimidine-3-oxide, 2-amino-4-methyl-5,6-bis(1-  
 pyrodinyl)pyrimidine-3-oxide, 2-amino-4-methyl-5-piperidino-6-  
 (1-pyroridinyl)pyrimidine-3-oxide, 2-methyl-4-amino-6-  
 piperidinopyrimidine-3-oxide, 2-methyl-4-amino-5-bromo-6-(1-  
 pyrodinyl)pyrimidine-3-oxide, 2-methyl-4-amino-5-nitro-6-  
 piperidinopyrimidine-3-oxide, 2-methyl-4,5-diamino-6-  
 piperidinopyrimidine-3-oxide, 2-methyl-4-amino-5,6-bis(1-  
 pyrodinyl)pyrimidine-3-oxide, 2-amino-4-methyl-6-  
 piperidinopyrimidine-3-oxide monohydrochloride, 2-acetylamino-4-

methyl-6-pyperidinopyrimidine-3-oxide, 2,4-diamino-6-  
 phenoxy pyrimidine-3-oxide, 2,4-diamino-6-(2,4-  
 dichlorophenoxy)pyrimidine-3-oxide, 2,4-diamino-6-(2,4,6-  
 trichlorophenoxy)pyrimidine-3-oxide, 2,4-diamino-5-nitroso-6-  
 (2,4-dichlorophenoxy)pyrimidine-3-oxide, 2,4-diamino-5-nitro-6-  
 (2,4,6-trichlorophenoxy)pyrimidine-3-oxide, 2,4-diamino-5-nitro-  
 6-(2,4-dichlorophenoxy)pyrimidine-3-oxide, 2,4,5-triamino-6-  
 (2,4-dichlorophenoxy)pyrimidine-3-oxide, and 2,4-diamino-5-  
 bromo-6-(2,4-dichlorophenoxy)pyrimidine-3-oxide), p-menthane-  
 3,8-diol, monoglyceryl-D-glucoside monotridecanoate, 1-o-N-  
 pentadecylglycero-D-glucoside, glyceride sulfate such as  
 monopentadecanoyl glyceride sulfate salt, monopentadecylglyceryl  
 ether sulfate, 1-o-hexadecyl-2-o-methylglycerol, 1-o-octadecyl-  
 2-o-methylglycerol, 1-o-oleyl-2-o-methylglycerol,  
 acetylcarnitine or salts thereof, geranylgeranylacetone,  
 hydroxamic acid derivatives or salts thereof, zingerone  
 glycosides, benzene oxyacetate derivatives (such as [5-[2-[1-  
 phenyl-1-(3-pyridyl)methylideneaminoxy]ethyl]-7,8-  
 dihydronaphthalen-1-yloxy]acetate), isorhamnetin-3-robinobioside,  
 xanthone derivatives, proanthocyanidins (such as  
 proanthocyanidin from a grape seed extract, proanthocyanidin  
 derived from apples, proanthocyanidin derived from pine,  
 purified procyanidin oligomer, procyanidin B-1, procyanidin B-2,  
 procyanidin B-3, and procyanidin C-1), *Quercus glauca* extract,  
*angelica* extract, *Prunus armeniaca* L. var. *ansu* extract, *Prunus*  
*armeniaca* extract, *Pyrola japonica* extract, *Cytisus scoparius*  
 extract, *Plantago asiatica* extract, *Alnus sieboldiana* extract,  
 olive extract, *Veronica persica* extract, *Polygonatum sibiricum*



extract, *Trichosanthes cucumeroides* extract, *Trichosanthes kirilowii* extract, *Chrysanthemum* extract, *Chrysanthemum indicum* extract, *Chrysanthemum zawadskii* extract, *Catalpa ovata* extract, kukui nut extract, *Cinnamomum camphora* extract, cubeba extract, *Rhamnus japonica* extract, *Schizonepeta tenuifolia* extract, *Osmanthus fragrans* extract, *Antirrhinum majus* extract, *Citrus tachibana* peel extract, *Camellia hiemalis* extract, coriander extract, *Magnolia kobus* extract, *Magnolia liliflora* extract, *Kadsura japonica* extract, *Kadsura japonica* Dunal extract, *Schisandra nigra* extract, colombo extract, condurango extract, *Camellia sasanqua* extract, sweet potato extract, *Zizyphus jujuba* extract, *Sophora subprostrata* extract, potato extract, *Blechnum niponicum* extract, *Gardenia jasminoides* extract, coriander extract, stevia extract, *Euphorbia pekinensis* extract, *Ilex latifolia* extract, *Aralia elata* extract, *Picrasma quassioides* extract, *Rhus javanica* extract, *Drynaria fortunei* extract, *Magnolia denudata* extract, *Iris florentina* extract, *Dryopteris nipponensis* extract, *Gnaphalium affine* extract, *Codonopsis pilosula* extract, mangosteen extract, *Zingiber mioga* extract, *Melaleuca alternifolia* extract, *Alnus firma* extract, *Alnus pendula* extract, *Alnus sieboldiana* extract, *Leonurus heterophyllus* extract, *Alnus hirsuta* extract, *Phragmites communis* extract, logwood extract, lantana extract, and so on.

[0065]

(30) Hair mother cell proliferation inhibitor/hair growth inhibitor

Phthalazinones, benzoxadinones, phosphoric acid derivatives, cypoterone, 5- $\alpha$ -androstene-3 $\alpha$ ,17 $\beta$ -diol, medoroxypogesterone,

norethisterone, mestanolone, Iris tectorum extract, Polygoni multiflori extract, kanto extract, Cremastra appendiculata extract, Gracilaria bursa-pastoris extract, Atractylodes lanceae extract, Genista tinctoria extract, common duckweed extract, Commiphora myrrha extract, Champia parvula extract, Sargassum siliquastrum extract, and so on.

[0066]

(31) Odor material eliminating agent

Dill extract, elemi extract, dammar extract, vanilla beans extract, pine extract, and so on.

[0067]

(32) Aroma

Natural animal flavoring such as musk, civet, castor, and amber grease; plant flavoring such as anise essential oil, angelica essential oil, ylang-ylang essential oil, iris essential oil, fennel essential oil, orange essential oil, cananga essential oil, caraway essential oil, cardamom essential oil, guaiac wood essential oil, cumin essential oil, Lindera umbellata essential oil, cinnamon essential oil, cinnamon essential oil, geranium essential oil, copaiba balsam essential oil, coriander essential oil, perilla essential oil, cedar wood essential oil, citronella essential oil, jasmine essential oil, ginger-grass essential oil, Japanese cedar essential oil, spearmint essential oil, peppermint essential oil, star anise essential oil, tuberose essential oil, clove essential oil, neroli essential oil, winter green essential oil, tolu balsam essential oil, patchouli essential oil, rose essential oil, palmarosa essential oil, hinoki essential oil, hiba essential

oil, santal essential oil, petitgrain essential oil, bay essential oil, vetivert essential oil, bergamot essential oil, peru balsam essential oil, bois de rose oil, linaloe wood essential oil, mandarin essential oil, eucalyptus essential oil, lime essential oil, lavender essential oil, linaloe essential oil, lemongrass essential oil, lemon essential oil, rosemary essential oil, and Japanese mint essential oil; and other synthetic aromas, and so on.

[0068]

(33) Pigment and colorant

Red cabbage pigment, red rice pigment, madder pigment, annatto pigment, sepia pigment, turmeric pigment, scholar pigment, krill pigment, persimmon pigment, caramel, gold, silver, gardenia pigment, corn pigment, onion pigment, tamarind pigment, spirulina pigment, buckwheat (whole plant) pigment, cherry pigment, laver pigment, hibiscus pigment, grape juice color, marigold pigment, purple potato color, purple yam color, lac color, and so on.

[0069]

(34) Sweetening

Sugar, hydrangea tea, fructose, arabinose, galactose, lactitol, maltitol, xylose, stevia, mannose, maltose, honey, glucose, miraculin, morellin, licorice extract, and so on.

[0070]

(35) Nutrition enrichment

Seashell-calcined calcium, cyanocobalamin, yeast, wheat germ, egg yolk powder, hemicellulose, heme iron, and so on.

[0071]

(36) Capsule

Agar capsules, pectin capsules, gelatin capsules, capsules of cellulose or a derivative thereof, capsules of chitin or a derivative thereof, capsules of chitosan or a derivative thereof, shellack capsules, polylysine capsules, polyaspartic acid capsules, polyglutamic acid capsules, collagen capsules, and so on.

[0072]

(37) Diluent

Potato starch, wheat starch, pectin, cornstarch, rice starch, lactose, sucrose, glucose, mannitol, sorbitol, calcium phosphate, calcium sulfate, calcium carbonate, calcium hydrogen carbonate, calcium citrate, cellulose and derivatives thereof, talc, white clay, diatom, dextrin, stearic acid, magnesium stearate, dimethylsiloxane, macrogol, polyvinyl pyrrolidone, polyvinyl ether, tragacanth, and so on.

[0073]

Furthermore, others such as hormone, metal ion chelating agents, pH adjusters, chelating agents, preservative/fungicide, fresheners, stabilizers, emulsifying agents, animal/plant protein and decomposed products thereof, animal/plant polysaccharides and decomposed products thereof, animal/plant glycoprotein and decomposed products thereof, antiinflammatory/antiallergy agents, wound treatment agents, foaming agents, thickeners, enzymes, purified water (electron water, subclusterization, and so on), odor eliminating/removing agents, and the like can be used additionally.

[0074]

[Examples]

The present invention will now be more specifically described by showing a method example for manufacturing cholesterol metabolism improving agent, a test example, and prescription examples that are used in the present invention, but the present invention is not limited thereto.

[0075]

(Manufacturing example 1) Method for manufacturing persimmon tannin as a condensed polyphenol compound

Ten kilograms of ripe fruits, including the pericarp, of Diospyros kaki as a raw material was milled and immersed in 20 L of a 50% ethanol aqueous solution for three days at room temperature. The immersing solution was filtrated, and then the filtrate was applied to a column packed with an adsorbent (Diaion HP, Mitsubishi Chem. Ind.). The column was washed with purified water, and then the component adsorbed on the adsorption was eluted out with a 50% ethanol aqueous solution. The eluate was concentrated under reduced pressure and then lyophilized to give 500 g of persimmon tannin, which is a condensed polyphenol compound.

[0076]

(Test example 1) Test of cholesterol metabolism improving activity

Wistar strain male rats of three groups (six rats each group) were fed on high cholesterol diets for 14 days. The compositions of the diets are shown in Table 1. One group, as a control group, was fed on a diet not containing condensed polyphenol compounds. Two groups were used for investigating a

cholesterol metabolism improving activity. One of the two groups was fed on a diet containing 2.0 mass% of the persimmon tannin obtained in the manufacturing example 1 as a condensed polyphenol compound, and the other group was fed on a diet containing 4.0 mass% of the persimmon tannin. The rats were fed for 13 days and then fasted for 24 hours and were slaughtered by collecting blood from the heart. The blood was centrifuged at 3000 rpm for 15 minutes to give serum. The resulting serum was quantitatively measured for serum total cholesterol and high-density lipoprotein cholesterol levels. The quantitative measurement was conducted by an enzyme method. Specifically, the total cholesterol content was measured with Cholesterol E-test Wako (Wako Pure Chemical Ind., Ltd.), and the content of high-density lipoprotein cholesterol was measured with HDL-cholesterol test Wako (Wako Pure Chemical Ind., Ltd.). The low-density lipoprotein cholesterol level was calculated from the obtained total cholesterol level and the high-density lipoprotein cholesterol level. Figure 1 shows the measurement results of serum total cholesterol contents, high-density lipoprotein cholesterol contents, and low-density lipoprotein (including very low-density lipoprotein) cholesterol contents in ingestion or non-ingestion of the condensed polyphenol compound. In addition, the liver lipids were extracted from the slaughtered rats by a method of Folch, et al. and the liver total cholesterol contents were measured using Cholesterol E-test Wako (Wako Pure Chemical Ind., Ltd.). Figure 2 shows the measurement results of liver total cholesterol levels in ingestion or non-ingestion of the condensed polyphenol compound.

Furthermore, the total cholesterol content per 100 g of each rat body weight was quantitatively measured by the same method as above. Figure 3 shows the measurement results of the total cholesterol content per 100 g of rat body weight in ingestion or non-ingestion of the condensed polyphenol compound. All the quantitative values obtained in these tests are shown by average values of each group.

[0077]

[Table 1]

Diet composition under test (g/1000 g diet)

	Control group	Group fed on a diet containing 2.0 mass% condensed polyphenol compound	Group fed on a diet containing 4.0 mass% condensed polyphenol compound
Casein	228.05	228.05	228.05
Condensed polyphenol compound (persimmon tannin in manufacturing example 1)	0	20	40
Lard	50	50	50
Corn oil	10	10	10
Cellulose	50	50	50
Mineral mixture <sup>*1</sup>	35	35	35
Vitamin mixture <sup>*2</sup>	10	10	10
Sucrose	200.98	194.32	187.95
Starch	401.96	388.63	375.30
Cholesterol	5	5	5
Sodium cholate	2.5	2.5	2.5
Choline hydrochloride	2	2	2
Total diet weight			1000 g

\*1: (Ca: 5000 mg, P: 1561 mg, K: 3600 mg, S: 300 mg, Na: 1019 mg, Cl: 1571 mg, Mg: 507 mg, Fe: 35 mg, Zn: 30 mg, Mn: 10 mg, Cu: 6 mg, I: 0.2 mg, Mo: 0.15 mg, Se: 0.15 mg, Si: 5 mg, Cr: 1.0 mg, F: 1.0 mg, Ni: 0.5 mg, B: 0.5 mg, Li: 0.1 mg, V: 0.1 mg)/1000 g mineral mixture

\*2: (thiamine hydrochloride: 6.36 mg, riboflavin: 6.0 mg, pyridoxine hydrochloride: 7.29 mg, nicotinic acid: 3.0 mg, calcium pantothenate: 16.31 mg, folic acid: 2.0 mg, cyanocobalamin: 0.025 mg, biotin: 0.2 mg, phylloquinone: 0.75 mg, retinyl palmitate: 4000 IU, cholecalciferol: 1000 IU, tocopherol acetate: 751 IU)/1000 g vitamin mixture

[0078]

(Results of test example 1) As shown in Figure 1, the serum total cholesterol level and low-density lipoprotein (including very low-density lipoprotein) cholesterol level were significantly decreased by feeding the condensed polyphenol compound, compared to those of the non-ingestion group, though the high-density lipoprotein cholesterol levels were maintained. Furthermore, as shown in Figure 2, the liver total cholesterol level in the group fed on the diet containing 4.0 mass% condensed polyphenol compound was significantly decreased. Furthermore, as shown in Figure 3, the total cholesterol level in the entire rat body was decreased by feeding the condensed polyphenol compound, compared to that of the non-ingestion group. These test results revealed that the intake of the condensed polyphenol compound decreases cholesterol levels in serum, the liver, and the entire body, but the level of serum high-density lipoprotein cholesterol was maintained. Thus, it was revealed that the condensed polyphenol compound had an excellent cholesterol metabolism improving activity.

[0079]

(Prescription) Drug, quasi-drug, and food containing the cholesterol metabolism improving agent



Prescription examples depending on the above evaluation results are shown bellow. Each of these prescriptions may be manufactured by a method that is usually used in the manufacturing of each product. Accordingly, only blending quantities are shown. The present invention is not limited thereto.

[0080]

(Prescription example 1) Capsule

1. magnesium ascorbate	0.5 g
2. persimmon tannin	5.0 g
3. DL- $\alpha$ -tocopherol acetate	0.5 g
4. silicone oil	30.0 g
5. Tween 80	0.05 g
6. cornstarch	63.95 g
<hr/>	
Total	100 g

The above-prescribed ingredients 1 to 6 were uniformly mixed, and 200 mg of the resultant mixture was filled in each capsule.

[0081]

(Prescription example 2) Capsule

1. macrogol	64.0 g
2. glycerol	8.0 g
3. persimmon tannin	2.0 g
4. diphenhydramine hydrochloride	0.1 g
5. thiamine hydrochloride	0.5 g
6. purified water	10.0 g
7. cornstarch	12.4 g
<hr/>	
Total	100 g

The above-prescribed ingredients 1 to 7 were uniformly mixed, and 200 mg of the resultant mixture was filled in each capsule.

[0082]

(Prescription example 3) Capsule

1. starch	65.0 g
2. persimmon tannin	3.0 g
3. condensed polyphenol compound (catechin : epicatechin : catechin gallate = 4:5:1)	3.0 g
4. mannitol	10.0 g
5. calcium hydrogen carbonate	5.0 g
6. <u>polyvinyl pyrrolidone</u>	14.0 g
Total	100 g

The above-prescribed ingredients 1 to 6 were uniformly mixed, and 200 mg of the resultant mixture was filled in each capsule.

[0083]

(Prescription example 4) Tablet

1. persimmon tannin	100.0 mg
2. cornstarch	50.0 mg
3. hydroxypropyl methyl cellulose	150.0 mg
4. <u>carboxymethyl chitin</u>	30.0 mg
Total	330 mg

[0084]

(Prescription example 5) Tablet

1. persimmon tannin	50.0 mg
2. condensed polyphenol compound (gallocatechin : catechin gallate : catechin = 2:4:4)	50.0 mg
3. cornstarch	80.0 mg
4. methyl cellulose	40.0 mg

5. magnesium stearate	20.0 mg
6. talc	10.0 mg

Total 250 mg

[0085]

(Prescription example 6) Tablet

1. persimmon tannin	20.0 mg
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2. condensed polyphenol compound

(gallocatechin gallate : epicatechin : catechin = 4:3:3)

20.0 mg

3. polyvinyl alcohol	160.0 mg
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4. carboxymethyl cellulose	50.0 mg
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5. magnesium stearate	5.0 mg
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Total 255 mg

[0086]

(Prescription example 7) Granule

1. persimmon tannin	50.0 mg
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2. carboxymethyl cellulose	180.0 mg
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3. propylene glycol	20.0 mg
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4. sodium alginate	30.0 mg
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5. sucrose	10.0 mg
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Total 290 mg

[0087]

(Prescription example 8) Granule

1. persimmon tannin	30.0 mg
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2. condensed polyphenol compound

(epicatechin gallate : epicatechin : catechin = 1:5:4)

30.0 mg

3. carboxymethyl cellulose	180.0 mg
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4. sodium alginate	30.0 mg
5. erythritol	10.0 mg
6. citric acid	5.0 mg
<hr/>	
Total	285 mg

[0088]

(Prescription example 9) Syrup mass%

1. persimmon tannin	2.0
2. condensed polyphenol compound	
(catechin gallate : gallocatechin gallate : catechin = 3:3:4)	
	2.0
3. sucrose	5.0
4. sorbitol	1.0
5. sodium citrate	0.5
6. sodium glutamate	0.5
7. flavor	adequate
8. purified water	balance for a total of 100

[0089]

(Prescription example 10) Syrup mass%

1. persimmon tannin	1.0
2. persimmon tannin fermentation product	1.0
3. ascorbic acid glucoside	0.5
4. silk extract	0.2
5. Scutellaria baicalensis extract	0.2
6. sucrose	2.0
7. sodium alginate	0.2
8. flavor	adequate
9. purified water	balance for a total of 100

[0090]

(Prescription example 11) Needle soup	mass%
1. soy sauce	80.0
2. brown vinegar	2.0
3. glucose	13.0
4. sodium glutamate	2.0
5. persimmon tannin	1.5
6. Japanese pepper extract	1.5

[0091]

(Prescription example 12) Japanese wheat noodle (udon) or buckwheat noodle (soba)	mass%
1. wheat flour or buckwheat flour	90.0
2. sodium chloride	1.0
3. persimmon tannin	4.0
4. birch extract	4.0
5. horse chestnut extract	1.0

[0092]

(Prescription example 13) Drink	mass%
1. glucose liquid	30.0
2. grapefruit juice	50.0
3. pomegranate extract	3.0
4. persimmon tannin	4.0
5. sodium hyaluronate	2.0
6. sodium chondroitin sulfate	2.0
7. mandarin orange juice	6.0
8. flavor	adequate
9. acidifier	adequate

[0093]

(Prescription example 14) Bread	mass%
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1. wheat flour	80.0
2. sodium chloride	1.0
3. glucose	8.0
4. persimmon tannin	3.0
5. sage extract	2.0
6. perilla extract	2.0
7. carboxymethyl chitin	2.0
8. tocopherol succinate	0.5
9. $\beta$ -carotene	0.5
9. heme iron	1.0

[0094]

(Prescription example 15) Sausage

	mass%
1. minced meat	85.0
2. hen egg	5.0
3. flavor	1.0
4. seasoning	1.0
5. persimmon tannin	4.0
6. capsicum extract	4.0

[0095]

(Prescription example 16) Gum

	mass%
1. menthol micron	30.0
2. grapefruit flavor	50.0
3. persimmon tannin	3.8
4. Mentha piperita extract	2.0
5. mugwort extract powder	2.0
6. ellagitannin	1.0
7. xylitol	10.0
8. sorbitol	balance

[0096]

(Prescription example 17) Miso soup		mass%
1. soybean curd		30.0
2. deep-fried bean curd		5.0
3. carrot		5.0
4. burdock		5.0
5. celery cabbage		5.0
6. red miso		20.0
7. persimmon tannin		6.0
8. bonito soup	balance for a total of 100	

[0097]

(Prescription example 18) Cookie		mass%
1. milk		62.0
2. whole egg		14.5
3. sugar		12.0
4. cornstarch		5.0
5. sodium chloride		0.5
6. persimmon tannin		2.0
7. flavor	adequate	

[0098]

The drug and food shown in prescription examples 4, 13, and 18 were routinely administered to adult females and males (37 subjects in total) through usual diets. As a result, a decrease in blood cholesterol level was observed in 23 subjects.

[0099]

[Advantages of the Invention]

The cholesterol metabolism improving agent containing a condensed polyphenol compound of the present invention can

significantly decrease cholesterol contained in serum, the liver, and the entire body and simultaneously maintain the amount of high-density lipoprotein cholesterol and thus exhibits an excellent cholesterol metabolism improving activity. Furthermore, arteriosclerosis can be prevented and improved by ingesting the cholesterol metabolism improving agent of the present invention through usual diets in a form of a drug, a quasi-drug, a food, or the like.

[Brief Description of the Drawings]

[Figure 1]

Figure 1 is a graph showing measurement results of rat serum total cholesterol levels, high-density lipoprotein cholesterol levels, and low-density lipoprotein cholesterol levels in ingestion or non-ingestion of the condensed polyphenol compound.

[Figure 2]

Figure 2 is a graph showing the measurement results of rat liver total cholesterol levels in ingestion or non-ingestion of the condensed polyphenol compound.

[Figure 3]

Figure 3 is a graph showing the measurement results of total cholesterol levels in the entire rat body in ingestion or non-ingestion of the condensed polyphenol compound.



ボタンバク質コレステロール含有量の測定結果を示した図である。

【図2】縮合型ポリフェノール化合物の摂取又は非摂取状態で、ラット肝臓中の総コレステロール含有量の測

定結果を示した図である。

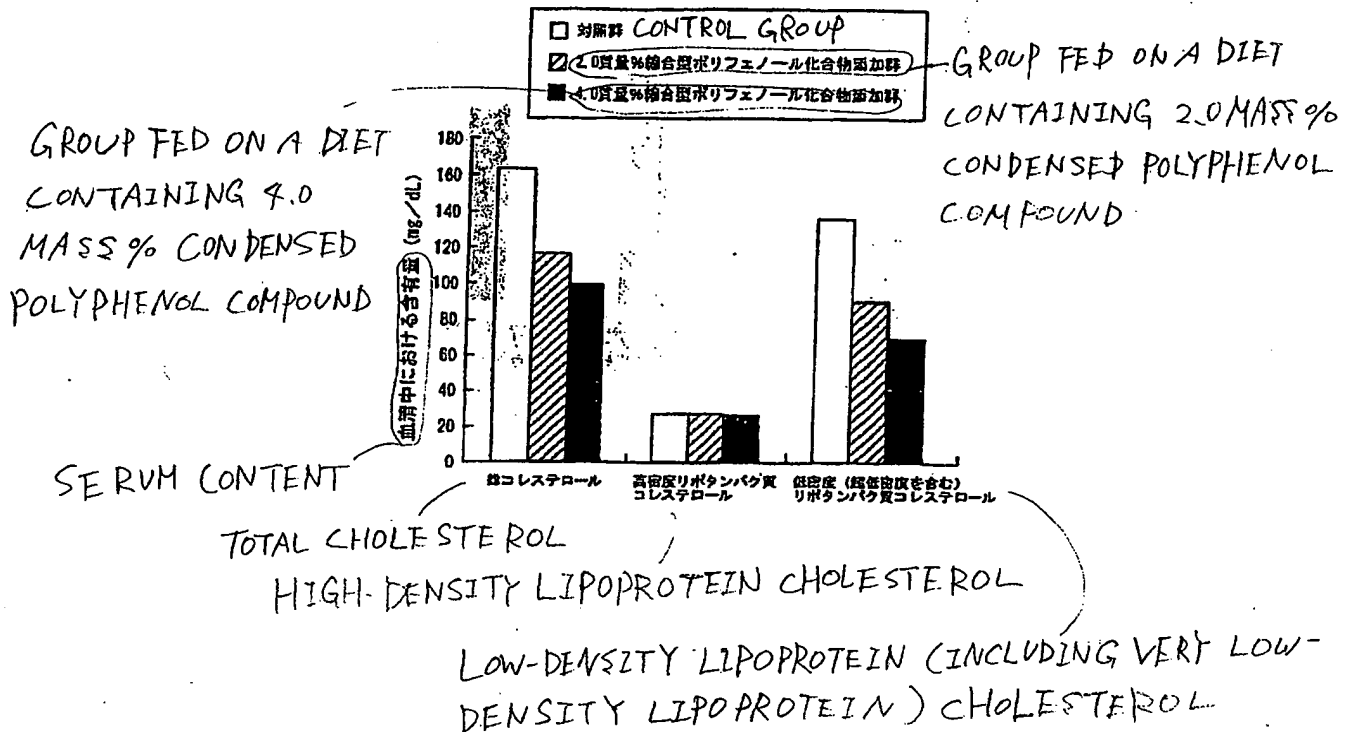
【図3】縮合型ポリフェノール化合物の摂取又は非摂取状態で、ラット生体中の総コレステロール含有量の測定結果を示した図である。

【図1】

# EFFECT OF CONDENSED POLYPHENOL COMPOUND ON RAT SERUM CHOLESTEROL LEVEL

縮合型ポリフェノール化合物のラット血清中のコレステロール含有量

への影響

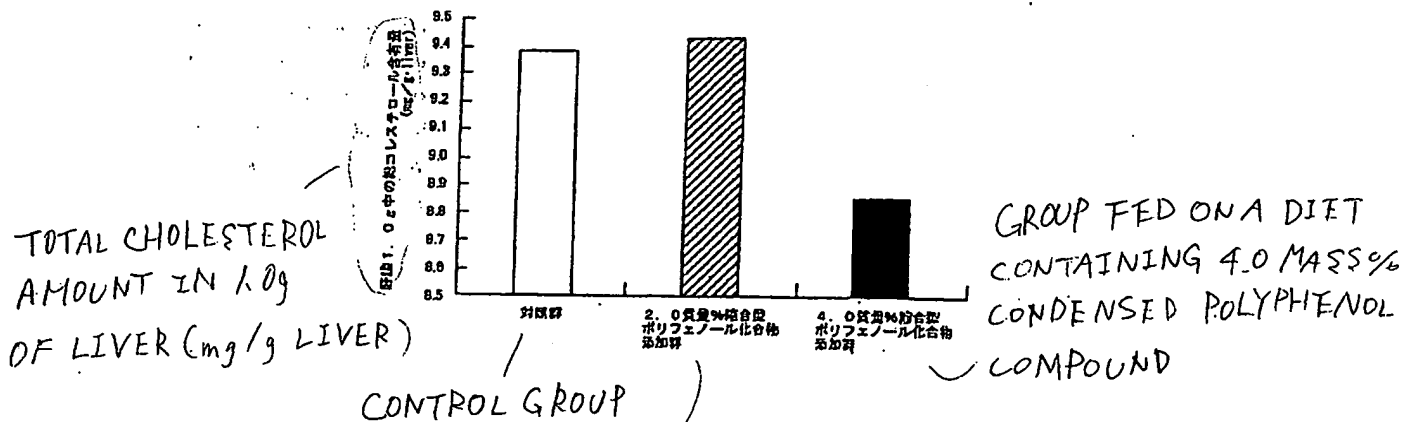


【図2】

# EFFECT OF CONDENSED POLYPHENOL COMPOUND ON RAT LIVER CHOLESTEROL LEVEL

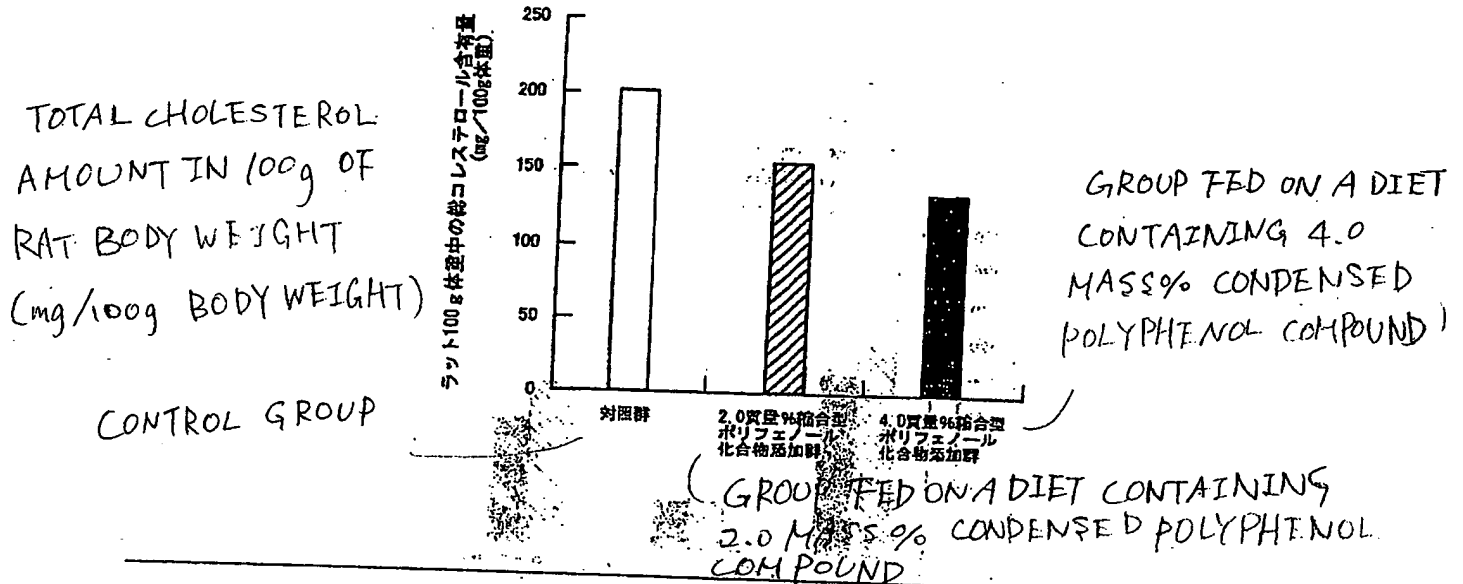
縮合型ポリフェノール化合物のラット肝臓中のコレステロール含有量

への影響



【図3】  
EFFECT OF CONDENSED POLYPHENOL COMPOUND ON CHOLESTEROL  
LEVEL IN THE ENTIRE RAT BODY

縮合型ポリフェノール化合物のラット生体中のコレステロール含有量  
への影響



フロントページの続き

(51) Int. Cl. 7

A 6 1 P 3/06  
9/10

識別記号

1 0 1

F I

A 6 1 P 3/06  
9/10

テマコード (参考)

1 0 1

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Fターム (参考) 4B018 MD08 MD48 MD52 ME04 MF01  
4C062 FF44

4C086 AA01 AA02 BA08 FA02 MA01

MA02 MA03 MA04 MA23 MA35

MA37 MA52 NA14 ZA45 ZC33

4C088 AB24 AC03 AC04 AC05 BA08

BA14 BA21 BA32 CA04 CA14

MA23 MA35 MA37 MA52 ZA45

ZC33

[Figure 1]

- #1 Effect of condensed polyphenol compound on rat serum cholesterol level
- #2 Control group
- #3 Group fed on a diet containing 2.0 mass% condensed polyphenol compound
- #4 Group fed on a diet containing 4.0 mass% condensed polyphenol compound
- #5 Serum content (mg/dL)
- #6 Total cholesterol
- #7 high-density lipoprotein cholesterol
- #8 low-density lipoprotein (including very low-density lipoprotein) cholesterol

[Figure 2]

- #1 Effect of condensed polyphenol compound on rat liver cholesterol level
- #2 Total cholesterol amount in 1.0 g of liver (mg/g liver)
- #3 Control group
- #4 Group fed on a diet containing 2.0 mass% condensed polyphenol compound
- #5 Group fed on a diet containing 4.0 mass% condensed polyphenol compound

[Figure 3]

- #1 Effect of condensed polyphenol compound on cholesterol level in the entire rat body

- #2 Total cholesterol amount in 100 g of rat body weight  
(mg/100g body weight)
- #3 Control group
- #4 Group fed on a diet containing 2.0 mass% condensed  
polyphenol compound
- #5 Group fed on a diet containing 4.0 mass% condensed  
polyphenol compound